

UNIVERSITY OF WASHINGTON DEPARTMENT OF OCEANOGRAPHY

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Technical Report No. 134

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA
FROM THE NORTHEAST PACIFIC OCEAN:
COLUMBIA RIVER EFFLUENT AREA, JANUARY-JUNE 1963

Volume I

Brown Bear Cruise 318: 27 February - 20 March

Acona Cruise 6301-E: 24-25 January

Prepared by
C. M. LOVE
With the Data Analysis

Scientific Program
Under the general direction of
Clifford A. Barnes

U.S. Atomic Energy Commission
Contract No. AT(45-1)-1725
RLO-1725-32

Office of Naval Research
Contracts Nonr-477(10)
and Nonr-477(37)
Project NR 083 012

Reference M65-55
March 1966

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INTRODUCTION

This six volume report contains oceanographic data collected by the University of Washington Department of Oceanography and other agencies during the months of January to June 1963. Two principal ships were used, the Research Vessel Brown Bear of the University of Washington and the Canadian Naval Auxiliary Vessel Oshawa. The cruises aboard the Oshawa were joint investigations by the Pacific Naval Laboratory (P.N.L.), Pacific Oceanographic Group (P.O.G.), and University of Washington (U.W.). In addition, biological data collected during one cruise of the Research Vessel Acona and aboard the chartered fishing vessel Betty A are included. A University of Washington staff member took part in the Acona Cruise in cooperation with Oregon State University. The numbers and dates of these cruises and the volume in which the data will be found are as follows:

<u>Cruise No.</u>	<u>Dates, 1963</u>	<u>Volume Containing Data</u>
<u>Acona 6301-E*</u>	24-25 January	I
<u>Brown Bear 318</u>	27 February - 20 March	I
<u>Oshawa-1 (OS1)</u>	12-26 March	II
<u>Brown Bear 320</u>	28 March - 10 April	II
<u>Brown Bear 322</u>	16 April - 1 May	III
<u>Betty A-1 (BA1)</u>	9-11 May	III
<u>Brown Bear 323</u>	13-19 May	III
<u>Brown Bear 324</u>	21 May - 4 June	IV
<u>Oshawa-2 (OS2)</u>	22 May - 12 June	V
<u>Brown Bear 326</u>	13-23 June	VI
<u>Oshawa-3 (OS3)</u>	17-30 June	VI
<u>Brown Bear 327</u>	24 June - 1 July	V

* Biological data only

These cruises are part of a continuing series designed to provide data for a year-round study of the water characteristics along the Washington-Oregon coast with special emphasis on the fresh water entering the system from the Columbia River. The objectives of this study are to determine the gross features of the movement and dispersion of Columbia River effluent water in the open sea off the mouth of the river and along the adjacent coast, and ultimately to ascertain the probable fate of any radioactive material that might be associated with the effluent or with river-borne materials. Funds for this investigation are being provided by the United States Atomic Energy Commission under Contract No. AT(45-1)-1725 and by the United States Office of Naval Research Contracts Nonr-477(10) and Nonr-477(37), Project NR 083 012.

Cruise Operations and Objectives

Most of the cruises presented herein were routine cruises for the purpose of obtaining physical, chemical, and productivity data and

phytoplankton samples during various seasons of the year. These cruises were Brown Bear 318, Oshawa-1, Brown Bear 320, 322, 323, 324, Oshawa-2, and Oshawa-3. Zooplankton samples were also collected on all the Brown Bear cruises listed above. Cruise 326 was primarily for the instruction of students enrolled in a summer session course entitled "Field Experience in Oceanography." Routine physical-chemical measurements were made, with emphasis on certain submarine canyons. Other activities included productivity measurements, bottom sampling in Willapa Canyon, and a comparison of various methods of collecting biological samples. Cruise 327 was primarily a reconnaissance of certain features of Cobb Seamount. The work included current measurements with Richardson meters, bathymetric surveys using a Precision Depth Recorder, and tests of the holding power of various anchors. However, a few oceanographic stations were occupied enroute to and at the seamount. Participation in Acona Cruise 6301-E was for the purpose of obtaining phytoplankton data during the winter at a time when the Brown Bear was undergoing repairs. The Betty A Cruise was made to insure continuity of observations of phytoplankton productivity during the expected period of the important spring bloom along the Washington coast. A fishing vessel was chartered to fill an unavoidable gap of several days between consecutive cruises of the Brown Bear. The cruise tracks and station locations for each cruise are shown in the appropriate volume. It should be noted that each of the three Oshawa cruises was concurrent with one or more Brown Bear cruises. The tracks of these concurrent cruises were planned to give maximum synoptic coverage of the study area.

Types of Observations

Temperature, salinity, and dissolved oxygen were determined at all oceanographic stations. At selected stations additional water samples were drawn for "extra chemistry" analyses; namely, phosphate, silicate, and nitrate. In most cases these extra chemistry samples were frozen aboard ship and returned to Seattle for analysis ashore. Samples for productivity and chlorophyll measurements and for phytoplankton light saturation experiments were obtained at certain of the oceanographic stations. Submarine irradiance data were collected once a day. On most cruises a 12-inch (30.5 cm) Secchi disc was lowered at daylight stations where productivity measurements were made, and continuous recordings of solar radiation were made.

In addition to the above mentioned data which are tabulated in this report, several other types of collections and observations were made on some or all cruises. Zooplankton samples were collected from horizontal tows in the upper 200 meters using Clarke-Bumpus samplers. The ship's times of the tows and depths sampled are listed in the Biological Data tables. Phytoplankton samples were collected from the Van Dorn samplers at noon stations and preserved for future counting and identification. Samples for phytoplankton fractionation experiments were taken from the surface water noon stations. A few zooplankton and water samples were collected on behalf of the Laboratory of Radiation Biology, University of Washington. A description of their investigations and a discussion of the results has been given by Seymour and Lewis (1964).

On Brown Bear cruises the salinity-temperature deviation recorder provided a continuous record of the deviations of temperature and salinity of the near-surface water (approximately 8 feet depth) from pre-selected base values. Mechanical bathythermograph lowerings were made at all stations on most cruises. On Cruises 318, 323, and 327 the electronic bathythermometer was used instead at some stations. Samples for ammonia analysis were collected on Cruises 318, 323, and 324. A few bottom samples were collected with Van Veen on Shipek samplers on Cruises 322, 323, 324, and 326. Also on Cruise 326 there were inductive salinometer lowerings and hydrophotometer measurements and bottom sampling by means of piston corer and dredge.

On 26 May 1963 a rendezvous of the three research vessels, Oshawa, Brown Bear, and Acona of Oregon State University was held at a location some 120 miles off the Oregon coast. A comparison oceanographic station was made, with a simultaneous messenger release on all three vessels. Data from the Brown Bear and Oshawa stations are included in this report, being stations 324-37 and OS2-23, respectively.

Preliminary reports describing the work performed have been issued for all cruises except 327. (Sanger, 1964a; Love and Sanger, 1963a; Morse, 1964; Stevens and Sanger, 1964; Dawson, 1964; Sanger, 1964b; Love and Sanger, 1963b; Stevens, 1963; Morse and Sanger, 1964; Collias, 1964; Love, 1963). The physical oceanography of the area has been discussed by Budinger, Coachman, and Barnes (1964). Selected aspects of phytoplankton distribution and production have been treated by Anderson (1963).

Collection of Samples

Nansen bottles were used to obtain the water samples for salinity, oxygen, and extra chemistry analysis except as noted below. Chlorophyll and productivity samples were collected with modified Van Dorn plastic samplers (Van Dorn, 1957). Some samples for salinity and extra chemistry analysis were also drawn from the Van Dorn samplers. These results appear in the Biological Data section.

The four uppermost depths for chlorophyll and productivity samples corresponded to 100, 50, 10 and 1 per cent of the surface illumination. These depths were usually determined by use of a submarine irradiance meter which provides a reading of the ambient underwater light relative to the surface light. In a few cases the sampling depths were computed from extinction coefficients as obtained from secchi-disc measurements. (Poole and Atkins, 1929)

Determination of Properties and Accuracy of Measurements

Two protected reversing thermometers were used on each Nansen bottle. In addition, all or most of the bottles below approximately 200 meters carried an unprotected thermometer. The temperatures shown are, in most cases, the average of two protected thermometer readings after application of the usual expansion and index corrections.

The depths of subsurface observations were calculated from measured wire angles; from readings of unprotected reversing thermometers; and from smoothed curves of wire length minus thermometric depth (L-Z) versus wire length (L), the difference method described by La Fond (1951).

The salinity determinations were run with the University of Washington salinometer (Paquette, 1958). The majority of the salinity samples were run aboard ship, but those from Cruises Oshawa-1 and Brown Bear 327 were analyzed ashore. On Cruises 318 and 322 some samples were analyzed aboard ship and the remainder ashore. The values obtained have a reproducibility of ± 0.004 ‰ salinity at the 95 per cent probability level and a probable accuracy of ± 0.01 ‰ salinity or better at the same level of probability.

It may be noticed that on some stations the salinity values obtained from Van Dorn casts, which are tabulated in the Biological Data sections, do not agree with, nor fit on a smooth curve with, the Nansen bottle salinities, although in some cases both were run on the same salinometer by the same operator at approximately the same time. Some reasons for these discrepancies can be suggested as follows: a) the casts were taken at different times. b) Even if the tabulated depths are the same to the nearest meter, the samples were not taken from exactly the same depth. At a station with a sharp vertical salinity gradient this difference in depth would be an important factor. Also, the methods used to determine the depths of the two types of samples may not have been the same. c) The geographical positions of the two casts were not identical due to ship's drift. d) The persons collecting the two types of samples did not use the same technique for rinsing the sample bottles. e) The Van Dorn samplers were not adequately flushed because they were used at relatively shallow depths and were tripped without allowing enough "soaking" time.

Dissolved oxygen was measured by the modified Winkler method described by Thompson and Robinson (1939). All the oxygen analyses were run aboard ship.

Phosphate values were obtained by the method of Wooster and Rakestraw (1951), except that the color intensities were measured with a Beckman spectrophotometer Model DU, and a constant temperature bath set at 27° Celsius was used to bring all samples and standards to the same temperature. Most of the phosphate values tabulated are from frozen samples analyzed at a later date ashore, but a few are the result of shipboard analysis of unfrozen samples. The following table shows the type of phosphate data tabulated for each cruise:

Cruise	Frozen samples analyzed at a later date ashore	Unfrozen samples analyzed aboard ship
<u>Acona</u> 6301-E	All data	
<u>Brown Bear</u> 318	All data	
<u>Oshawa-1</u>		No phosphate data
<u>Brown Bear</u> 320		No phosphate data
<u>Brown Bear</u> 322	All data	
<u>Betty A-1</u>		No phosphate data
<u>Brown Bear</u> 323	All data	
<u>Brown Bear</u> 324	All data	
<u>Oshawa-2</u>	All data	
<u>Brown Bear</u> 326	Stations 24, 27, 30, 37, 43, 45, 50, 54, 55, 56, 57, 58 and 60	All remaining data
<u>Oshawa-3</u>	All data	
<u>Brown Bear</u> 327		All data

Silicate values were obtained by the molybdenum blue method of Mullin and Riley (1955a), except that sodium silicofluoride was used to prepare the standard solutions. All silicate determinations are from frozen samples analyzed ashore.

Nitrate values were obtained using the method of Mullin and Riley (1955b) with a few minor changes in the procedure for the addition of reagents. All nitrate determinations are from frozen samples analyzed ashore.

The chlorophyll samples were analyzed according to the method of Richards with Thompson (1952) as modified for use with the Millipore[®] filter (Creitz and Richards, 1955). A turbidity correction was made by subtracting the extinction at 7500Å from spectrophotometer readings at other wave lengths (Strickland and Parsons, 1960). The error in the technique is reported to be about $\pm 5\%$. A computer was used to process the data.

The radiocarbon method was used for productivity measurements (Steemann Nielsen, 1952). The error in the method is about $\pm 10\%$ (Strickland and Parsons, *loc. cit.*). Approximately 2.5 microcuries of radioactive carbonate $C^{14}O_3^{=}$ were added to sea water samples in 125 ml

[®] Registered trademark, Millipore Filter Corp., Bedford, Massachusetts.

light and dark pyrex reagent bottles. Incubator measurements were made under constant illumination of about 9150 lux using a bank of "Cool-White" fluorescent lights. Temperature was controlled with running surface sea water. After three to six hours of incubation, the samples were filtered on PH Millipore filters ($0.3 \pm 0.02\mu$) and stored over silica gel. Simulated in situ measurements were generally made twice daily, at dawn and at noon. Samples were incubated in a topside deck incubator exposed to full sunlight illumination. Kodak Wratten neutral density filters were used to simulate conditions of 50, 10, and 1 per cent surface illumination. Temperature was controlled by running surface sea water. Periods of incubation were either from sunrise to noon, or noon to sunset. Usually only a surface sample was incubated during the sunrise to noon period.

In the laboratory, the filters retaining the C^{14} were fumed with concentrated HCl for 10-15 minutes to remove traces of inorganic C^{14} . Geiger counting equipment consisted of a Nuclear-Chicago Model D-47 gas flow counter with micromil window, 161-A scaler, C-110 automatic sample changer, and C-111B printing timer. Each sample was counted until a minimum number of 1280 total counts was obtained. Computer processing of the data included corrections for background, dark bottle uptake, variations in inorganic carbon content of sea water, coincidences and isotope effect (5%).

Light saturation experiments were conducted as follows:

At each noon station, primary productivity samples from one of the routine productivity sampling depths were incubated at different light intensities to determine the light saturated rate of photosynthesis of the phytoplankton community. The intersect of extrapolations from the initial linear and light saturated region of the resultant curve of photosynthesis vs. light intensity is used to express the onset of light saturation (Talling 1957). The four routine sampling depths were rotated so that each depth was selected every four days of operation.

Samples were enclosed in 60-ml pyrex reagent bottles (6 light and 2 dark), inoculated with C^{14} in the usual manner and placed in an incubator with running surface sea water for temperature control. Each of five light bottles was covered with a neutral filter of different density to vary the fraction of light received by the phytoplankton. The sixth light bottle was exposed to full illumination of about 21,500 lux. Illumination was provided by a bank of high output "Cool-White" fluorescent tubes. Intensity was measured at the beginning and end of the experiment with a Weston sunlight illumination meter. The actual total light intensity for each experiment is listed in the Biological Data section. Samples were incubated for at least two hours before filtration. Subsequent procedure was the same as for routine productivity samples.

Irradiance measurements were made with a Marine Advisers, Incorporated, Model C-1a irradiance meter. A brief description of the instrument and its use has been given by Love and Sanger (1963a).

The following quantities were computed with the IBM 7094 Data Processing System at the Research Computer Laboratory of the University of Washington: σ_t , apparent oxygen utilization (AOU), and oxygen saturation for observed values; the interpolated values of temperature, salinity, and oxygen at standard oceanographic depths; the interpolation error for each of the above quantities; σ_t for interpolated values; specific volume anomaly (10^{-6}), potential energy anomaly, geopotential anomaly ($\Sigma\Delta D$), and variance ratio. Programs developed at the Department of Oceanography were used. Oxygen solubility is calculated according to the equations of Truesdale and Gameson (1957). The interpolation program is based on two three point Lagrange parabolic interpolation polynomials (Buckingham, 1957). This interpolation scheme yields two estimates of the interpolated value of a property at each standard depth. The first polynomial makes use of two observed values from depths above the desired standard depth and one value from a depth below; the second polynomial uses one value above and two below. The resultant interpolated value is the numerical average of the two estimates. The error of interpolation is equal to the difference in magnitude between the two Lagrange interpolation polynomials times a factor depending on the third derivatives. This factor is given the value 0.33 in this computer program. The derivation of this error term is given by Buckingham (1957). A discussion of this system of interpolation and error determination and a derivation of the value 0.33 for the factor is given by Rattray (1962). The equations for σ_t are taken from LaFond (1951), and the equations for specific volume anomaly and geopotential anomaly are those used by the U.S. Navy Hydrographic Office in their computer program (U.S. Navy Hydrographic Office, 1955b) except that the pressure in decibars is used instead of the depth. The equations for pressure and potential energy anomaly are taken from Froese (1960). In general, observed values marked as questionable (see page 8) are not used for interpolation.

The variance ratio is the ratio of the variance of the interpolation polynomial to the variance of the measurement. The magnitude of this ratio gives an indication of whether the vertical spacing of observed values is adequate to accurately portray the distribution of properties in that region of the curve. As shown by Rattray (1962) the value should remain close to unity. The two quantities, variance ratio and error of interpolation, can be taken as joint indications of the accuracy of the interpolated values. A large variance ratio indicates inadequate vertical spacing of observed values, but if the vertical gradient of properties is small in this region of the curve the error of interpolation will still be small. On the other hand a small variance ratio may be accompanied by large errors of interpolation in regions of steep vertical gradients, such as the thermocline or halocline. Large values of the variance ratio which may occur at the final interpolated depth reflect a necessary change in the interpolation scheme at that depth when there is only one observed value below the desired standard depth.

The geographical positions are based on navigational fixes obtained by the watch officers of the Brown Bear and the Oshawa. Aboard

the Brown Bear, at locations within 18 nautical miles of shore the fix was usually obtained from radar ranges and bearings; beyond that distance loran was used. In the area in which these cruises operated, the error of loran fixes is considered not to exceed one mile. Aboard the Brown Bear a fix was obtained immediately upon arrival on station in most cases, and another fix obtained prior to departure from station. Occasionally one or more fixes were also obtained at intermediate times while on station. The positions reported herein for all Brown Bear cruises except 327 are usually "mean" positions, determined graphically, lying between the arrival and departure fixes, and taking into account any intermediate fixes obtained. For Cruise 327 the arrival fixes are reported.

Oshawa positions were obtained by loran in most cases. An arrival and departure fix were taken and the mean of the two positions reported as the station position. When possible the loran fixes were checked by celestial observations.

Aboard the Betty A the positions of stations 1, 3, and 4 were obtained by loran; the position of station 2 was obtained by dead reckoning.

Miscellaneous Comments

Acona cruise numbers are prefixed with "AC", Betty-A numbers with "BA". All others are prefixed with the full name of the vessel. By the use of this system, each station of each cruise is uniquely identified. In most cases the "productivity only" stations mentioned previously have been designated by a number and a letter, such as 16A, 28A, etc. In addition, stations in inshore waters or ocean stations located close to the coast are further identified by naming them for a coastal landmark in that vicinity. Prominent landmarks such as headlands, islands, harbor entrances, or towns were used whenever possible, but on some stretches of the coast there are no such prominent landmarks. In these cases other features such as the mouths of small rivers, villages, nearby mountain peaks, or lakes located immediately behind the beach were used.

Oshawa stations in this series of cruises have similar designations; "CNAV OSHAWA ^^ CRUISE 001 ^^ STATION 001" represents the first station of the first joint P.N.L.-P.O.G.-U.W. cruise, etc.

The data tables contain a few apparently anomalous values of various properties which do not fit on a smooth curve of the particular property versus depth. These questionable values are marked with an asterisk (*). They have been checked to the extent that existing original data sheets, work sheets, and other information will allow and cannot be proved incorrect.

Occasionally an obviously incorrect machine-interpolated value was noted when checking the data and was replaced by a hand-interpolated value. Such hand-interpolated values are marked in the tables by a record mark (†).

Personnel

At Sea: The following persons were members of the scientific staff on the cruises indicated. Personnel from the Department of Oceanography are identified by their job title, those from other organizations by the name of the organization. (L) indicates Cruise Leader; (S) indicates Senior Scientist.

<u>Name</u>	<u>Title or Organization</u>	<u>Cruise No.</u>
Anderson, Dr. George C.	Research Assistant Professor	OS1, OS2(L)
Andrews, John E.	Marine Aide	322, 323, 324
Andrews, Robert S.	Research Assistant	326
Angell, Charles	Marine Technician	OS1, 323
Armand, Donald J.	Marine Technician	318, 320, 322, 323, 324, 327
Baker, James V.	Marine Technician	320, 322
Baldwin, John	LT, U.S. Navy; student	326
Bauer, Laurence	Marine Technician	OS1, 322, OS2
Beck, John R.	Senior Marine Aide	326
Becker, James F.	Cartographer	322
Best, M.	Pacific Oceanographic Group	OS2
Boon, John D.	Student Helper	326
Cline, Joel D.	Research Assistant	326
Collias, Eugene E.	Senior Oceanographer	326 (L)
Cooney, Robert T.	Teaching Assistant	326
Conlon, Edward J.	Marine Technician	318, 320, BA1, 324, OS3
Dawson, William A.	Research Instructor	322 (L)
Deirup, Karl	Marine Aide	318
Dermody, John	Principal Oceanographer	OS1 (L)
Douglass, Peter M.	Marine Aide	322, BA1, 323, OS2, OS3
Dworski, J. George	Senior Oceanographer	320, 323, 327
English, Dr. T. Saunders	Assistant Professor	326 (S)
Evans, Harry V.	Marine Technician	318, 320, 323, 324, 327
Fagan, James M.	Marine Aide	322, 323, 324, 326, 327
Fenton, Douglas	Assistant Geologist	327
Gassert, John M.	Vessel Operator	318
Gucluer, Sevet	LT, Turkish Navy; Senior Marine Aide	OS1
Hill, Emory	Marine Aide	318
Hobson, Louis A.	Teaching Assistant	OS3
Hoskin, George P.	Student	326
Howland, John H.	LT, U.S. Navy; Student	326
Hussong, David M.	Marine Aide	327
Jain, Vijay K.	Assistant Oceanographer	323
Johnson, Kenneth J.	Marine Technician	OS1
Kisker, Dale S.	Student	326

<u>Name</u>	<u>Title or Organization</u>	<u>Cruise No.</u>
Love, Cuthbert M.	Senior Oceanographer	318 (L), 323 (L), OS3 (L)
McGary, Noel B.	Cartographer	324
Morris, Robert	Marine Aide	324
Moses, Ray E.	Student	326
Nakashima, D. B.	Marine Technician	318, 320, 323, OS2, OS3
Olund, B.	Pacific Oceanographic Group	OS2
Omor, Makoto	Laboratory Technician	320
Peterson, Richard R.	Marine Aide	OS3
Piety, John P.	Student Helper	326
Ririe, Ronald	Electronics Technician	322
Royse, Chester F.	Research Assistant	326
Ryan, Daniel J.	Marine Technician	322, 324, 326
Sands, Walter C.	Senior Oceanographer	318, 327 (L)
Sanger, Gerald A.	Assistant Biologist	318, 320, BA1 (L), 323, OS2
Semon, Darrelyn	Assistant Oceanographer	322
Shrack, Robert	Marine Technician	OS1, OS2, OS3
Spierling, Richard M.	Marine Aide	OS3
Stanley-Jones, Arthur	Pacific Oceanographic Group	OS2
Stevens, John W.	Oceanographer	320 (L), 324 (L)
Sweetland, Russell F.	Senior Marine Technician	327
Taylor, Phillip A.	Engineer	327
Thomas, Lawrence E.	Marine Aide	OS3
Walker, Clarence L., Jr.	Student	326
Watson, John	Marine Technician	OS1
Willenbrink, James F.	LT, U.S. Navy; Student	326
Winter, Robert	Marine Aide	327
Youngquist, John A.	LT, U.S. Navy; Student	326
Anderson, Clarence F.	Owner and Master, Fishing Vessel <u>Betty A</u>	
Ivarson, O. Tom	Master, R.V. <u>Brown Bear</u>	
MacFarlane, D. C.	Master, C.N.A.V. <u>Oshawa</u>	

Ashore: The following persons, as well as a number of the sea-going personnel, were engaged in the analysis and preparation of these data for publication:

<u>Name</u>	<u>Title</u>
Adams, Donald D.	Research Assistant
Becker, James F.	Assistant Cartographer
Blackburn, Gene T.	Marine Technician
Buck, Dale R.	Marine Aide
Budinger, Thomas F.	Senior Oceanographer
Cromoga, Richard	Cartographer
Doyle, Donald R.	Senior Cartographer
Edenso, Jim	Tab Machine Operator
Fritz, James E.	Senior Marine Aide
Grant, Ronald L.	Marine Technician
Green, Linda S.	Programmer
Harris, John A.	Senior Marine Aide
Hoverson, Sigmund J.	Marine Technician
Hulbert, David W.	Marine Technician
Johnston, Allan H.	Senior Marine Aide
Larson, Harold	Assistant Cartographer
Lesh, Michael	Marine Technician
Long, Linda K.	Laboratory Technician
Meller, Meredythe	Laboratory Technician
Morse, Betty-Ann	Oceanographer
Nutt, Mary	Marine Aide
Rautenberg, Carol	Office Assistant
Riley, Ralph W.	Marine Chemist
Rolland, John O.	Marine Technician
Rona, Monique	Senior Programmer
Von Gal, Edwyna	Laboratory Technician
Walker, William R.	Programmer
Wallin, Marsha M.	Programmer

EXPLANATION OF DATA TABLES

The information in the data tables was transcribed directly from IBM cards using an IBM 1401 Data Processing System. A blank space in the tables or headings indicates that no observation was taken. The original data and the interpolated and computed values punched on the cards are in most cases recorded or coded in accordance with the procedures used by the National Oceanographic Data Center; however, some weather information is coded with U.S. Navy Hydrographic Office codes. The codes used to describe weather and sea conditions, etc., will be found in NODC Publication M-2 (National Oceanographic Data Center, 1964) or in H.O. Publication No. 606-c (U.S. Navy Hydrographic Office, 1956) and H.O. Publication No. 607 (U.S. Navy Hydrographic Office, 1955a). Some changes were made in the card format but these do not affect the arrangement of the data in this report. Abbreviations and column headings are described below and, where necessary, the NODC or Hydrographic Office numerical codes have been reproduced to aid in interpreting the data.

Abbreviations and Headings Used in Data Tables

DATE	For Observed Values the date given is Greenwich day/month/year. For Biological Data the date given is local (ship's time, +8 zone) day/month/year.
HR (Hour)	Greenwich mean time to the nearest tenth of an hour of the messenger drop on the first cast.
LAT (Latitude and LONG (Longitude)	In degrees and minutes; or in degrees, minutes, and tenths of minutes on some stations.
SNDG (Depth of water)	Depth of water in meters at the station as determined by the ship's echo sounder. This depth was generally recorded immediately after the ship arrived on station.
WEA (Weather)	State of the weather. One of two possible codes was used for reporting present weather. A two-digit number in this space indicates use of WMO Code 4677, shown on page 20; one number preceded by an X indicates use of WMO Code 4501, shown on page 22. The X has no significance except to indicate which code was used.
WIND VEL. DIR (Wind velocity and direction)	Wind velocity in knots. Wind direction, see code, page 18.

BAROM (Barometric pressure)	To obtain the barometric pressure in millibars, add 900 if this number is above 50; add 1000 if below 50.
TEMP DRY <u> </u> WET <u> </u> (Air temperature, dry, wet bulb)	In degrees Celsius.
RELHU (Relative Humidity)	Expressed in per cent.
WTRCLR (Water color)	Expressed according to the Forel-Ule scale. See code, page 21.
SECDI (Water transparency)	Depth in meters to which a 12-inch (30.5 cm) Secchi disk could be seen on daylight stations.
SEA <u> </u> DIR <u> </u> (Sea state and direction)	State of the sea, see code, page 19. Direction from which sea was coming, see code, page 18.
SWELL <u> </u> DIR <u> </u> (Swell amount and direction)	Height and wave length of swell, see code, page 19. Direction from which swell was coming, see code, page 18.
DOM WAVE DIR <u> </u> HT <u> </u> PER <u> </u> (Dominant wave direction, height, and period)	Dominant wave characteristics (National Oceanographic Data Center, 1964) were reported on some cruises instead of sea and swell. Direction from which waves were coming, see code, page 18. Height of waves, see code, page 21. Period of waves, see code, page 22.
CLOUD TYPE <u> </u> AMT <u> </u> (Cloud type and amount)	Cloud type, see code, page 17. Amount of cloud cover, see code, page 18.
VIS (Visibility)	Range of visibility. See code, page 18.
WIRE ANGLE(S)	In degrees. Wire angles are tabulated only for those casts whose numbers appear in the "Cast" column at the left of the page, i.e., casts from which data were obtained. The first number is the wire angle for Cast 1, or the lowest numbered cast appearing, the second for Cast 2, etc. Dashes (- -) indicate the wire angle was not recorded for that cast.
CST (Cast)	Cast number.
DEPTH	Depth in meters from which sample was obtained.

TEMP (Temperature)	In degrees Celsius.
SAL (Salinity)	In parts per thousand ($^{\circ}/_{\infty}$).
SIGMA-T (σ_t)	An expression for the density of sea water at atmospheric pressure, having the indicated temperature and salinity. To convert sigma-t values to density, divide by 1000 and add 1; thus sigma-t 22.42 = density 1.02242.
OXYGEN (Dissolved Oxygen)	
ML/L	In milliliters per liter.
MGA/L	In milligram-atoms per liter.
AOU (Apparent oxygen utilization)	In milligram-atoms per liter.
SATN (Saturation)	Per cent of oxygen saturation.
PHOS (Phosphate-phosphorus)	In microgram-atoms per liter ($\mu\text{g-at/l}$)
NITR (Nitrate-nitrogen)	In microgram-atoms per liter ($\mu\text{g-at/l}$)
SIL (Silicate-silicon)	In microgram-atoms per liter ($\mu\text{g-at/l}$)
CHL-A (Chlorophyll <u>a</u>)	In milligrams per cubic meter
PRODUCTIVITY, LAB-I (Incubator productivity)	Expressed as milligrams carbon assimilated per cubic meter per hour.
PRODUCTIVITY, DECK-I (Simulated <u>in situ</u> productivity)	Expressed as milligrams carbon assimilated per cubic meter per day.
LIGHT SAT	Data from light saturation experiments. Refer to text, page 6.
PROD (Productivity)	Productivity of sample receiving the indicated amount of illumination. Expressed as milligrams of carbon assimilated per cubic meter per hour.
FILT (Filter)	Indicates the per cent of total incubator illumination transmitted to the sample through a neutral density filter. The total incubator illumination in units of lux is listed at the bottom of the Biological Data section.

IRRAD (Irradiance)	Per cent of surface solar radiation reaching the indicated depth.
OXY (Dissolved oxygen)	Units are indicated in the column heading. In the Biological Data section oxygen is reported in milligram-atoms per liter. In the Interpolated and Computed Values oxygen is reported in milliliters per liter.
WATER COLUMN VALUES	Integrated values over the water column from the surface to the bottom of the euphotic zone for CHL-A, LAB-I, and DECK-I. The values at 100 meters and below are not included in this integration because they are below the euphotic zone.
MESSENGER TIME	Messenger time (ship's time, +8 zone) of the productivity cast.
INCOMING SOLAR RADIATION - AM ____ PM ____	Expressed in calories per square centimeter. The AM value is the integrated value of incoming radiation from sunrise to ship's noon; PM represents from ship's noon to sunset.
ZOOPLANKTON	Indicates that zooplankton samples were collected at this station. The information following indicates the type of sampler or net used, the type of tow made, the times of the tow, and the depths sampled, as follows:
(CLARKE-BUMPUS)	Clarke-Bumpus sampler
(HALF-METER NET)	Half-meter net
(MIDWATER TRAWL)	Midwater trawl
HORIZ	Horizontal tow
VERT	Vertical tow
OBL	Oblique tow
STEP	Stepped tow
TIME (from - to)	Ship's time (+8 zone) of the tow
DEPTHS	Depths sampled

Example: Station 318-6

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0154-0204 DEPTHS 100, 70
0232-0243 30, 0

means that two horizontal tows using Clarke-Bumpus were made. The first tow began at 0154 ship's time, lasted until 0204 and sampled at 70 and 100 meters (two samplers on the wire). The second tow sampled at the surface and 30 meters and lasted from 0232 to 0243 ship's time.

LIGHT SATURATION
INCUBATOR ILLU-
MINATION

Total incubator illumination for light saturation experiments. Expressed in lux.

SP VOL ANOMALY
(Specific volume
anomaly, 10^{-5})

The anomaly of specific volume at the indicated temperature, salinity, and pressure compared to a standard water of 0°C temperature and 35 ‰ salinity, at the same pressure. Tabular values multiplied by 10^{-5} will give the anomaly in units of cubic centimeters per gram.

GEOPOT ANOMALY (Geo-
potential anomaly,
ΣAD)

Geopotential anomaly in dynamic meters of the layer of water between the surface and the indicated depth.

POT ENERGY (Potential
energy anomaly)

Potential energy anomaly in units of 10^8 ergs per square centimeter of the layer of water between the surface and the indicated depth.

VAR RATIO (Variance
ratio)

The ratio of the variance of the interpolation polynomial to the variance of the measurement. The value of the variance ratio is an indication of the adequacy of the vertical spacing of the observed values upon which the interpolation is based. See page 7. Values close to 1 indicate optimum spacing. Values greater than 3 indicate that the vertical spacing is inadequate to represent faithfully the distribution of properties in this region of the curve. In the case of missing values, where different combinations of observed values may be used to interpolate at the same depth, the variance ratio which indicates the worst spacing has been printed. Values greater than 100 have been printed as 99.99. If the observed depth corresponds to a desired standard depth, no interpolation is made and the variance ratio is not computed.

E(T) (Temperature interpolation error)	Interpolation error, in degrees Celsius, of the temperature value at this depth. For a discussion of the interpolation error, see page 7. If the observed depth corresponds to a desired standard depth, the interpolation error will be zero.
E(S) (Salinity interpolation error)	Interpolation error, in parts per thousand, of the salinity value at this depth. See comments under E(T) above.
E(O) (Oxygen interpolation error)	Interpolation error, in milliliters per liter, of the oxygen at this depth. See comments under E(T) above.
*	Indicates a questionable value. See page 8.
†	Indicates a hand-interpolated value. See page 8.

Codes Used for Reporting Observations

Taken from National Oceanographic Data Center Publication M-2, "Processing Physical and Chemical Data from Oceanographic Stations," or U.S. Navy Hydrographic Office Publication No. 606-c, "Hydrographic Office Observers Manual, Bathythermograph Observations," or U.S. Navy Hydrographic Office Publication No. 607, "Instruction Manual for Oceanographic Observations."

Cloud Type (taken from NODC Publication M-2) WMO Code 0500

Code

0	Cirrus	Ci
1	Cirrocumulus	Cc
2	Cirrostratus	Cs
3	Alto cumulus	Ac
4	Altostratus	As
5	Nimbostratus	Ns
6	Stratocumulus	Sc
7	Stratus	St
8	Cumulus	Cu
9	Cumulonimbus	Cb
x	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena	

Amount of Cloud Cover (taken from NODC Publication M-2) WMO Code 2700

Code

0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured, or cloud amount cannot be estimated	

Visibility (taken from NODC Publication M-2) WMO Code 4300

Code

0	Less than 50 metres (less than 55 yards)
1	50-200 metres (approx. 55-220 yards)
2	200-500 metres (approx. 220-550 yards)
3	500-1,000 metres (approx. 550 yards-5/8 n.m.)
4	1- 2 km (approx. 5/8-1 n.m.)
5	2- 4 km (approx. 1- 2 n.m.)
6	4-10 km (approx. 2- 6 n.m.)
7	10-20 km (approx. 6-12 n.m.)
8	20-50 km (approx. 12-30 n.m.)
9	50 km or more (30 n.m. or more)

Direction (taken from NODC Publication M-2)

Compass Direction from which Wind, Sea, or Swell is coming

Code

00	Calm, or no value
01 to 36	Each value represents 1/10 of the true direction in degrees, measured clockwise from the north, with 36 representing true north.

State of the Sea - Wind Waves (taken from NODC Publication M-2)
WMO Code 3700

Code	Description	Height (Feet)
0	Calm (Glassy)	0
1	Calm (Rippled)	0 - 1/3
2	Smooth (Wavelets)	1/3 - 1 2/3
3	Slight	1 2/3 - 4
4	Moderate	4 - 8
5	Rough	8 - 13
6	Very Rough	13 - 20
7	High	20 - 30
8	Very High	30 - 45
9	Phenomenal	over 45

Swell Conditions (taken from H.O. 606-c or H.O. 607)

Code	Approx. Height in Feet	Description		Approx. Length in Feet
0	0	No swell		0
1	1 - 6	Low swell	Short or average	0 - 600
2			Long	Above 600
3	6 - 12	Moderate	Short	0 - 300
4			Average	300 - 600
5			Long	Above 600
6	Greater than 12	High	Short	0 - 300
7			Average	300 - 600
8			Long	Above 600
9	---	Confused		

NUMERICAL WEATHER CODES—PRESENT WEATHER

00	01	02	03	04	05	06	07	08	09
Cloud development observed during past hour	Clouds generally increasing during past hour	Shine of sun or moon unchanged during past hour	Clouds generally increasing during past hour	Shine of sun or moon reduced by clouds during past hour	Shine of sun or moon unchanged during past hour	Shine of sun or moon reduced by clouds during past hour	Dust or sand falling at time of observation	Shine of sun or moon reduced by clouds during past hour	Shine of sun or moon unchanged during past hour
10	11	12	13	14	15	16	17	18	19
Light fog	Partial fog observed during past hour	Shine of sun or moon unchanged during past hour	Light fog observed during past hour	Partial fog observed during past hour	Partial fog observed during past hour	Partial fog observed during past hour	Thunder heard at time of observation	Thunder heard at time of observation	Thunder heard at time of observation
20	21	22	23	24	25	26	27	28	29
Drizzle (NOT observed during past hour)	Rain (NOT observed during past hour)	Shine of sun or moon unchanged during past hour	Rain and snow (NOT observed during past hour)	Foggy drizzle or drizzle and rain (NOT observed during past hour)	Shine of sun or moon unchanged during past hour	Shine of sun or moon unchanged during past hour	Shine of sun or moon unchanged during past hour	Fog during past hour but NOT observed during past hour	Thunderstorm (with or without hail) at time of observation but NOT at time of observation
30	31	32	33	34	35	36	37	38	39
Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour	Slight moderate or heavy drizzle or rain observed during past hour
40	41	42	43	44	45	46	47	48	49
Fog at distance at time of observation but NOT at time of observation	Fog in patches at time of observation	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour	Fog, dry drizzle or drizzle and rain observed during past hour
50	51	52	53	54	55	56	57	58	59
Intermittent drizzle (NOT raining) light at time of observation	Continuous drizzle (NOT raining) light at time of observation	Intermittent drizzle (NOT raining) moderate at time of observation	Continuous drizzle (NOT raining) moderate at time of observation	Intermittent drizzle (NOT raining) heavy at time of observation	Continuous drizzle (NOT raining) heavy at time of observation	Slight freezing rain observed during past hour	Moderate or heavy freezing rain observed during past hour	Drizzle and rain observed during past hour	Drizzle and rain observed during past hour
60	61	62	63	64	65	66	67	68	69
Intermittent rain (NOT raining) light at time of observation	Continuous rain (NOT raining) light at time of observation	Intermittent rain (NOT raining) moderate at time of observation	Continuous rain (NOT raining) moderate at time of observation	Intermittent rain (NOT raining) heavy at time of observation	Continuous rain (NOT raining) heavy at time of observation	Slight freezing rain observed during past hour	Moderate or heavy freezing rain observed during past hour	Rain or drizzle and snow moderate or heavy	Rain or drizzle and snow moderate or heavy
70	71	72	73	74	75	76	77	78	79
Intermittent fall of snow, sleet, light at time of observation	Continuous fall of snow, sleet, light at time of observation	Intermittent fall of snow, sleet, moderate at time of observation	Continuous fall of snow, sleet, moderate at time of observation	Intermittent fall of snow, sleet, heavy at time of observation	Continuous fall of snow, sleet, heavy at time of observation	Slight snow (with or without fog)	Grainy snow (with or without fog)	Intermittent fall of snow, sleet, moderate or heavy	Continuous fall of snow, sleet, moderate or heavy
80	81	82	83	84	85	86	87	88	89
Slight (rain shower(s))	Moderate or heavy (rain shower(s))	Violent (rain shower or(s))	Slight shower(s) of rain and snow, moderate at time of observation	Moderate or heavy shower(s) of rain and snow, moderate at time of observation	Slight snow shower(s)	Moderate or heavy snow shower(s)	Slight shower(s) of rain or sleet with or without fog	Moderate or heavy shower(s) of rain or sleet with or without fog	Slight shower(s) of rain or sleet with or without fog
90	91	92	93	94	95	96	97	98	99
Moderate or heavy rain or rain and snow observed during past hour but NOT at time of observation	Slight rain at time of observation but NOT observed during past hour	Moderate or heavy rain or rain and snow observed during past hour but NOT at time of observation	Slight rain at time of observation but NOT observed during past hour	Moderate or heavy rain or rain and snow observed during past hour but NOT at time of observation	Slight rain at time of observation but NOT observed during past hour	Slight or moderate rain or rain and snow observed during past hour but NOT at time of observation	Heavy rain or rain and snow observed during past hour but not at time of observation	Thunderstorm (with or without hail) at time of observation but NOT at time of observation	Thunderstorm (with or without hail) at time of observation but NOT at time of observation

This code will be found in NODC Publ M-2 WMO Code 4677

Water Color (taken from NODC Publication M-2)

Forel-Ule scale and conversions from per cent yellow and
per cent brown scales

Per cent Yellow	Per cent Brown	Forel-Ule Scale	Code
0		I	01
2		II	02
5		III	03
9		IV	04
14		V	05
20		VI	06
27		VII	07
35		VIII	08
44		IX	09
54		X	10
65	0	XI	11
	2	XII	12
	5	XIII	13
	9	XIV	14
	14	XV	15
	20	XVI	16
	27	XVII	17
	35	XVIII	18
	44	XIX	19
	54	XX	20
	65	XXI	21

Height of Dominant Waves (Taken from NODC Publication M-2) WMO Code 1555

Code

0	Less than 1/4 m (1 ft)
1	1/2 m (1 1/2 ft)
2	1 m (3 ft)
3	1 1/2 m (5 ft)
4	2 m (6 1/2 ft)
5	2 1/2 m (8 ft)
6	3 m (9 1/2 ft)
7	3 1/2 m (11 ft)
8	4 m (13 ft)
9	4 1/2 m (14 ft)
x	Height not determined

Code If 50 is added to direction

0	5	m	(16	ft)
1	5 1/2	m	(17 1/2	ft)
2	6	m	(19	ft)
3	6 1/2	m	(21	ft)
4	7	m	(22 1/2	ft)
5	7 1/2	m	(24	ft)
6	8	m	(25 1/2	ft)
7	8 1/2	m	(27	ft)
8	9	m	(29	ft)
9	9 1/2	m	(30 1/2	ft)

Period of Dominant Waves (taken from NODC Publication M-2) WMO Code 3155

Code		Code	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	x	Calm, or period not determined
7	14 or 15 seconds		

Present Weather (taken from NODC Publication M-2) WMO Code 4501

Code
figure

- 0 Clear (no cloud at any level)
- 1 Partly cloudy (scattered or broken)
- 2 Continuous layer(s) or cloud(s)
- 3 Sandstorm, duststorm, or blowing snow
- 4 Fog, thick dust or haze
- 5 Drizzle
- 6 Rain
- 7 Snow, or rain and snow mixed
- 8 Shower(s)
- 9 Thunderstorm(s)

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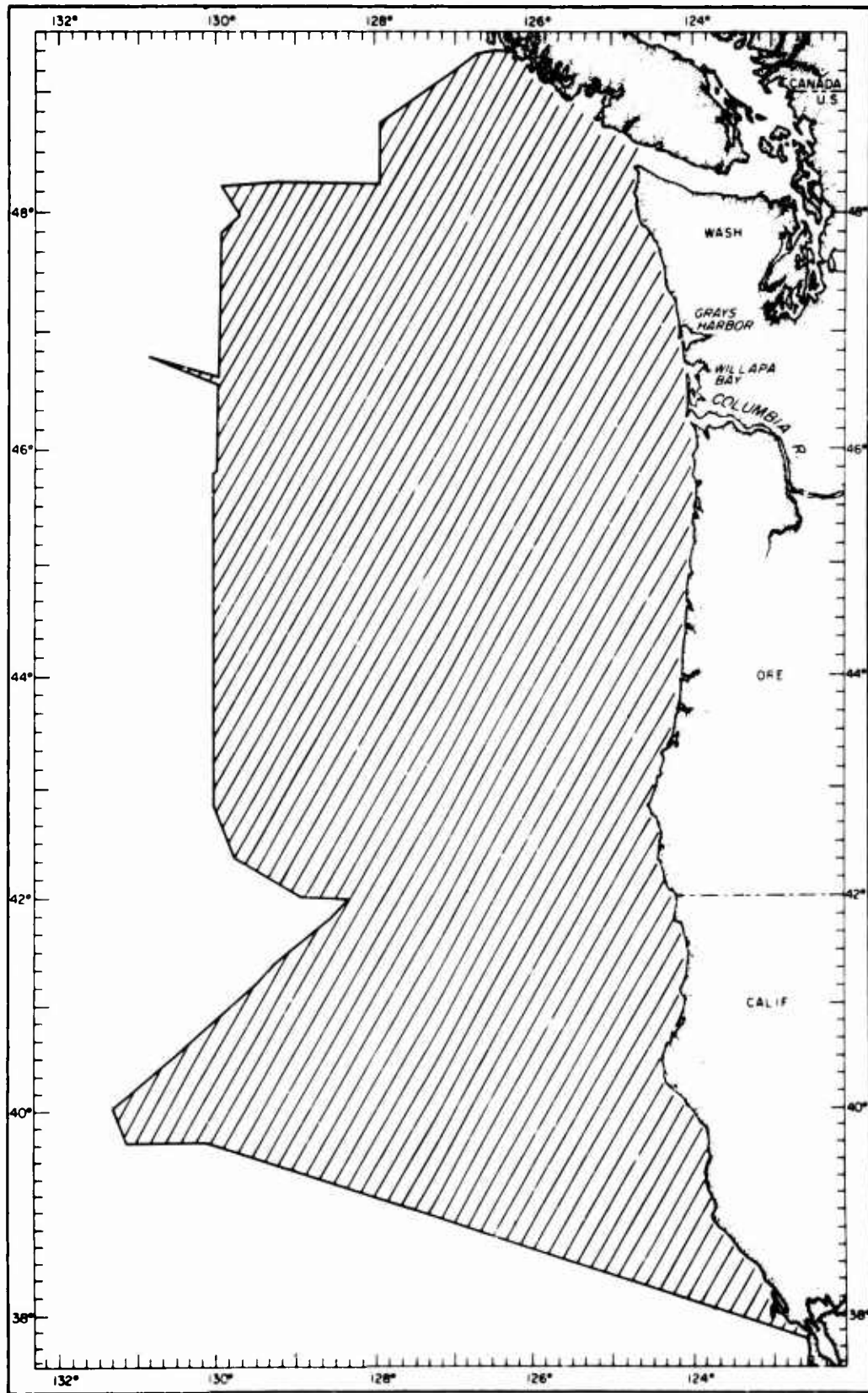


Fig. 1. Chart of a portion of the northeast Pacific Ocean showing area covered by the twelve cruises reported in volumes I-VI.

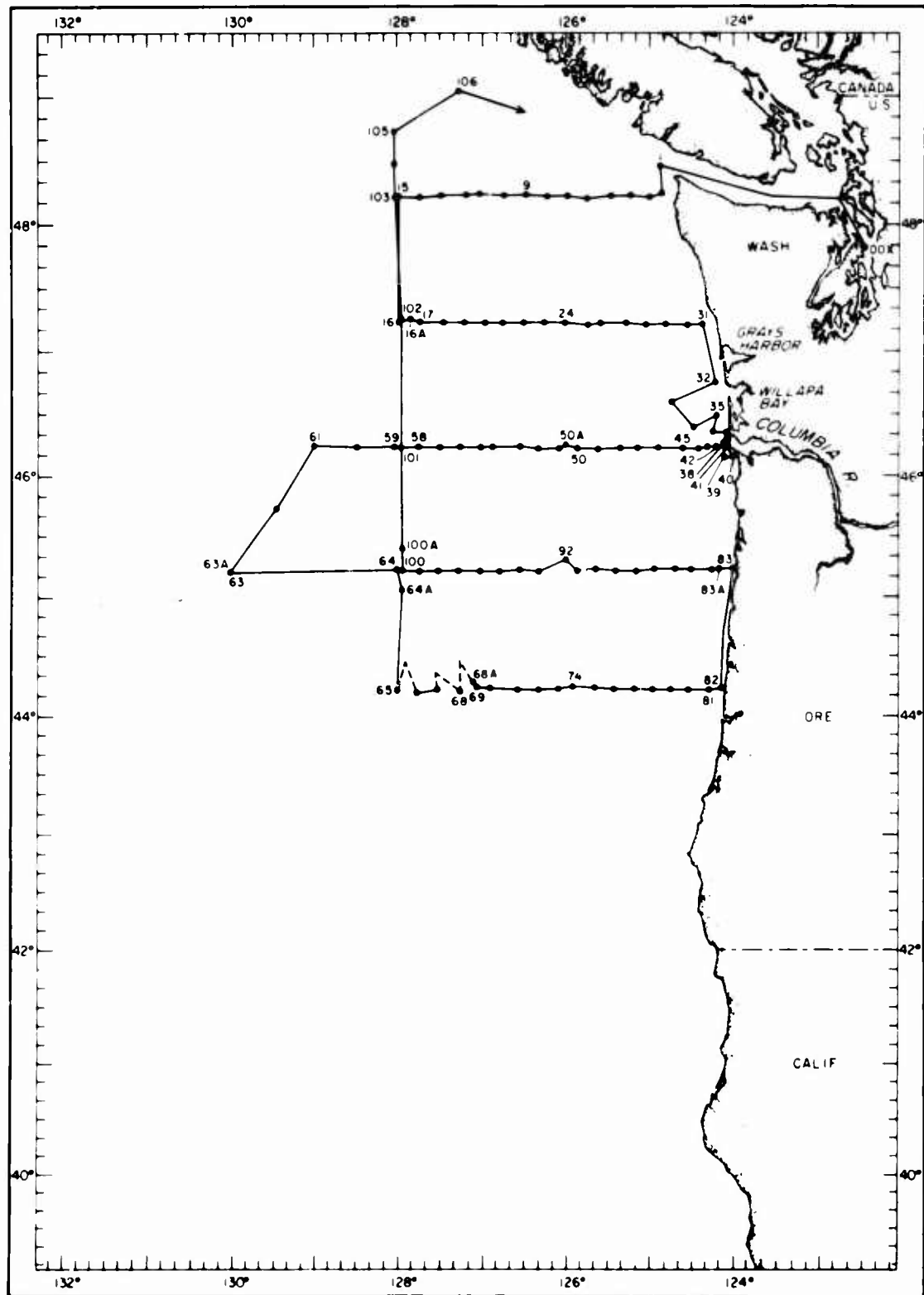


Fig 2 Station locations for Brown Bear Cruise 318, 27 February – 20 March 1963

BROWN BEAR CRUISE 318 STATION 00X BIOLOGICAL DATA

POINT JEFFERSON - PUGET SOUND

DATE 27/02/63 LAT 47-50 N LONG 122-27 W

PRODUCTIVITY
LAB-I DECK-I

DEPTH	CHL-A
0	0.30
1	0.18
4	0.29
9	0.38
100	0.37

2.61 - WATER COLUMN VALUES

MESSENGER TIME 1300

BROWN BEAR CRUISE 318 STATION 001 OBSERVED VALUES

TATOOSH ISLAND

DATE 28/02/63 HR 14.7 LAT 48-27 N LONG 124-51 W SNGD 288 MEA 63 WIND VEL 10 DIR 16
BAROM 22.0 TEMP DRY 7.2 WET 6.9 RELHU 97 WTRCLR SECDI SEA 2 DIR 16 SWELL 9 DIR
CLOUD TYPE 5 AMT 8 VIS 5 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.08	30.678	23.75	6.52	0.582	-0.007	101	1.08	1.08	10.9	22
1	5	9.09	30.679	23.75	6.69	0.598	-0.022	104	1.11	1.11	11.8	23
1	10	9.02	30.751	23.82	6.08	0.543	0.033	94	1.14	1.14	12.2	22
1	20	8.16	30.730	23.93	6.30	0.563	0.025	96	1.44	1.44	16.0	27
1	30	8.46	30.870	23.99	5.54	0.495	0.088	85	1.28	1.28	14.4	26
1	49	8.72	31.376	24.35	6.05	0.540	0.037	94	1.24	1.24	14.4	24
1	73	8.33	32.528	25.31	4.86	0.434	0.144	75	1.56	1.56	22.0	32
1	98	8.50	32.913	25.58	4.30	0.384	0.190	67	1.71	1.71	22.5	29
1	123	8.52	33.092	25.72	4.09	0.365	0.208	64	1.83	1.83	24.9	32
1	146	8.34	33.353	25.95	3.62	0.323	0.251	56	1.93	1.93	27.2	35
1	170	8.15	33.539	26.13	3.34	0.298	0.278	52	2.02	2.02	28.5	36
1	195	7.94			2.98	0.266			2.10	2.10	30.0	40
1	243	7.14	33.911	26.56	2.26	0.202	0.387	34	1.95	1.95	33.5	48

BROWN BEAR CRUISE 318 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	0.88	3.25			30.647
4	1.02	2.95			30.650
14	0.75	2.35			30.623
27	0.72	3.06			31.061
100	0.41	1.19			32.794

22.15 73.99 - WATER COLUMN VALUES

MESSANGER TIME 0600 INCOMING SOLAR RADIATION - AM 38 PM 94

BROWN BEAR			CRUISE 318			STATION 001			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	9.08	0.00	30.678	0.000	23.75	415.7	0.000	0.00	6.52	0.00					
10	9.02	0.00	30.751	0.000	23.82	409.5	0.042	0.02	6.08	0.00					
20	8.16	0.00	30.730	0.000	23.93	399.2	0.083	0.08	6.30	0.00					
30	8.46	0.00	30.870	0.000	23.99	393.0	0.123	0.19	5.54	0.00					
50	8.71	0.01	31.426	0.009	24.39	355.4	0.198	0.49	6.01	0.02	0.95				
75	8.34	0.01	32.578	0.008	25.35	264.9	0.276	0.98	4.80	0.00	0.89				
100	8.51	0.00	32.929	0.004	25.60	241.7	0.340	1.55	4.28	0.01	0.89				
150	8.31	0.00	33.388	0.001	25.98	205.6	0.453	2.97	3.57	0.01	0.81				
200	7.89	0.00	33.699	0.004	26.29	177.3	0.549	4.69	2.90	0.00	7.76				

BROWN BEAR CRUISE 318 STATION 002 OBSERVED VALUES

POINT OF THE ARCHES

DATE 28/02/63 HR 18.7 LAT 48-15 N LONG 124-50 W SNG 46 WEA 11 WIND VEL 17 DIR 16
 BAROM 21.3 TEMP DRY 9.7 WET 8.8 RELHU 89 WTRCLR SECDI 5 SEA 2 DIR 16 SWELL 9 DIR
 CLOUD TYPE 7 AMT 8 VIS 7 WIRE ANGLE(S) 29

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN ADU	SATN	PHOS	NITR	SIL
1	0	9.53	29.976	23.14	6.64	0.593	-0.021	104	0.91	7.3	20
1	4	9.54	30.451	23.50	6.60	0.589	-0.019	103	0.89	6.4	17
1	9	9.52	31.416	24.26	6.61	0.590	-0.024	104	0.79	5.4	15
1	18	9.60	31.748	24.50	6.51	0.581	-0.017	103	0.84	5.1	12
1	26	9.57	31.814	24.56	6.53	0.583	-0.019	103	0.87	5.6	12
1	35	9.52	31.845	24.59	6.38	0.570	-0.005	101	0.88	6.0	13

BROWN BEAR CRUISE 318 STATION 002 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT SAT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.22	6.96	14.10	5.95	100		30.165	0.52	3.2	8
				5.41	59					
				4.37	33					
				2.87	22					
				1.72	13					
				0.50	5					
3	1.04	4.72	20.80			50	30.233	0.76	4.3	12
6	1.12	4.57	3.60			10	30.454	0.91	5.2	17
12	1.04	4.90	0.40			1	31.025	0.91	4.6	14
35	0.56	2.20					31.497	1.00	6.4	14

13.11 59.85 100.90 - WATER COLUMN VALUES

MESSSENGER TIME 1125 INCOMING SOLAR RADIATION - AM 38 PM 94

LIGHT SATURATION INCUBATOR ILLUMINATION 23200

BROWN BEAR CRUISE 318 STATION 002 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.53	0.00	29.976	0.000	23.14	474.5	0.000	0.00	6.64	0.00	
10	9.53	0.00	31.504	0.025	24.33	361.1	0.043	0.02	6.60	0.00	0.93
20	9.60	0.00	31.776	0.006	24.53	342.1	0.078	0.07	6.52	0.01	0.71
30	9.54	0.00	31.820	0.009	24.57	338.2	0.112	0.16	6.50	0.01	1.25

BROWN BEAR CRUISE 318 STATION 003 OBSERVED VALUES

DATE 28/02/63 HR 21.9 LAT 48-14 N LONG 125-01 W SNRG 293 WEA 01 WIND VEL 12 DIR 26
 BAROM 21.3 TEMP DRY 10.0 WET 8.2 RELHU 79 WTRCLR SECDI SEA DIR SWELL DIR
 CLOUD TYPE AMT 4 VIS WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.84	32.243	24.85	6.51	0.581	-0.022	104	0.80	3.9	8	
1	5	9.78	32.240	24.86	6.53	0.583	-0.023	104	0.74	4.5	8	
1	10	9.73	32.239	24.86	6.54	0.584	-0.023	104	0.80	3.5	7	
1	20	9.78	32.239	24.86	6.53	0.583	-0.023	104	0.80	4.2	8	
1	30	9.74	32.251	24.87	6.53	0.583	-0.023	104	0.79	4.3	8	
1	49	9.76	32.249	24.87	6.47	0.578	-0.017	103	0.77	4.5	9	
1	74	9.72	32.601	25.15	5.97	0.533	0.026	95	0.97	7.3	10	
1	99	8.83	33.300	25.84					1.62	22.0	25	
1	124	8.24	33.640	26.19	3.34	0.298	0.276	52	2.02	27.5	35	
1	148	8.01	33.777	26.33	3.05	0.272	0.305	47	2.11	28.9	38	
1	173	7.78	33.787	26.38	2.99	0.267	0.313	46	1.83	22.0	30	
1	202	7.45	33.882	26.50	2.64	0.236	0.349	40	2.21	32.4	43	
1	251	7.08	33.949	26.60	2.31	0.206	0.383	35	2.43	33.0	48	

BROWN BEAR CRUISE 318 STATION 003 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.84	0.00	32.243	0.000	24.85	310.9	0.000	0.00	6.51	0.00	
10	9.73	0.00	32.239	0.000	24.86	309.7	0.032	0.02	6.52	0.00	
20	9.78	0.00	32.239	0.000	24.86	310.7	0.063	0.06	6.53	0.00	
30	9.74	0.00	32.251	0.000	24.87	309.3	0.094	0.14	6.53	0.00	
50	9.77	0.00	32.256	0.000	24.87	309.8	0.157	0.40	6.46	0.00	0.96
75	9.69	0.01	32.629	0.005	25.18	281.4	0.231	0.87	5.91	0.02	0.99
100	8.80	0.00	33.319	0.001	25.86	217.1	0.294	1.43	4.57	0.20	0.96
150	7.99	0.00	33.779	0.002	26.34	172.0	0.392	2.66	3.04	0.01	0.90
200	7.47	0.00	33.875	0.001	26.49	158.4	0.475	4.15	2.67	0.00	0.88
250	7.08	0.00	33.952	0.000	26.60	148.1	0.552	5.93	2.30	0.00	0.94

BROWN BEAR CRUISE 318 STATION 004 OBSERVED VALUES
 DATE 1/03/63 MR 01.5 LAT 48-14 N LONG 125-16 W SNOG 128 WEA 02 WIND VEL 12 DIR 27
 BAROM 23.4 TEMP DRY 9.3 WET 8.1 RELHU 85 WTRCLR SEA 2 DIR 27 SWELL 1 DIR 27
 CLOUD TYPE 5 AMT 5 VIS WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN
					ML/L	MGA/L		
1	0	9.56	32.109	24.79	6.44	0.575	-0.012	102
1	5	9.59	32.107	24.78	6.63	0.592	-0.029	105
1	9	9.59	32.147	24.82	6.64	0.593	-0.030	105
1	19	9.69	32.235	24.87	6.64	0.593	-0.032	106
1	28	9.70	32.215	24.85	6.62	0.591	-0.030	105
1	46	9.67	32.476	25.06	6.17	0.551	0.010	98
1	69	9.33	32.836	25.39	5.31	0.474	0.089	84
1	93	8.79	33.277	25.82	4.09	0.365	0.204	64
1	117	8.45	33.453	26.01	3.66	0.327	0.246	57

BROWN BEAR CRUISE 318 STATION 004 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.71	0.91	32.202
6	0.54	1.06	32.204
19	0.85	0.84	32.198
38	0.57	1.11	32.211

26.23 36.73 - WATER COLUMN VALUES

MESSENGER TIME 1655 INCOMING SOLAR RADIATION - AM 38 PM 94

BROWN BEAR CRUISE 318 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.70	1.09		32.082
6	0.57	1.03		32.093
19	0.68	0.96		32.091

11.94 28.72 - WATER COLUMN VALUES

MESSANGER TIME 2040 INCOMING SOLAR RADIATION - AM 38 PM 94

BROWN BEAR CRUISE 318 STATION 005				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.54	0.00	32.145	0.000	24.82	313.6	0.000	0.00	6.63	0.00	
10	9.58	0.00	32.121	0.000	24.80	316.1	0.032	0.02	6.67	0.00	
20	9.58	0.00	32.182	0.000	24.84	311.8	0.064	0.07	6.56	0.00	
30	9.50	0.00	32.647	0.000	25.22	276.3	0.093	0.14	5.79	0.00	
50	8.96	0.00	33.127	0.003	25.68	232.8	0.145	0.35	4.58	0.00	0.92
75	8.50	0.00	33.410	0.002	25.97	205.4	0.200	0.70	3.71	0.00	1.09

BROWN BEAR CRUISE 318 STATION 006 OBSERVED VALUES
 DATE 1/03/63 HR 11.4 LAT 48-13 N LONG 125-46 W WEA 03 WIND VEL 26 DIR 29
 BAROM 26.1 TEMP DRY 8.6 WET 5.8 RELHU 67 WTRCLR SECDI 475
 CLOUD TYPE VIS WIRE ANGLE(S) -- SEA 3 DIR 27 SWELL 1 DIR 27
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN -- -- SATN
 1 0 8.97 31.638 24.52 6.36 0.568 0.005 99
 1 5 8.98 31.630 24.51 6.54 0.584 -0.011 102
 1 10 8.97 31.638 24.52 6.54 0.584 -0.011 102
 1 19 9.00 31.650 24.52 6.59 0.589 -0.016 103
 1 29 8.98 31.650 24.52 6.57 0.587 -0.014 102
 1 48 8.87 32.076 24.87 6.01 0.537 0.036 94
 1 72 9.21 32.697 25.31 5.48 0.489 0.076 87
 1 97 8.00 33.104 25.81 5.08 0.454 0.126 78
 1 121 8.22 33.450 26.05 4.01 0.358 0.218 62
 1 144 7.88 33.364 26.03 3.85 0.343 0.238 41
 1 168 7.39 33.893 26.51 2.50 0.223 0.362 38
 1 192 7.19 33.938 26.58 2.38 0.213 0.375 36
 1 290 5.92 34.039 26.83 1.54 0.138 0.468 23

BROWN BEAR CRUISE 318 STATION 006 BIOLOGICAL DATA
 INCOMING SOLAR RADIATION - AM 54 PM 64
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0154-0204 DEPTHS 100, 70
 30, 0

BROWN BEAR			CRUISE 318			STATION 006			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	8.97	0.00	31.638	0.000	24.52	342.7	0.000	0.00	6.36	0.00			
10	8.97	0.00	31.638	0.000	24.52	342.9	0.035	0.02	6.54	0.00			
20	9.00	0.00	31.647	0.003	24.52	342.8	0.070	0.07	6.59	0.00	0.88		
30	8.97	0.00	31.665	0.004	24.54	341.2	0.104	0.16	6.55	0.01	0.97		
50	8.92	0.03	32.130	0.004	24.91	306.1	0.169	0.42	5.96	0.00	0.91		
75	9.07	0.05	32.754	0.003	25.37	262.6	0.241	0.88	5.45	0.02	0.85		
100	8.01	0.04	33.151	0.001	25.84	218.0	0.301	1.41	4.94	0.03	0.84		
150	7.75	0.01	33.769	0.006	26.37	169.3	0.399	2.63	3.51	0.08	0.93		
200	7.16	0.02	33.938	0.005	26.58	149.4	0.479	4.07	1.81	0.35	11.96		
250	6.90	0.13	33.902	0.037	26.59	149.3	0.555	5.81	1.36	0.39	69.66		

BROWN BEAR CRUISE 318 STATION 007 OBSERVED VALUES

DATE 1/03/63 HR 15.3 LAT 48-14 N LONG 126-01 W SNRG 860 MEA 50 WIND VEL 20 DIR 32
 BAROM 26.1 TEMP DRY 9.9 WET 7.7 RELHU 74 WTRCLR SEA 2 DIR 30 SWELL 3 DIR 13
 CLOUD TYPE 7 AMT 9 VIS WIRE ANGLE(S) ---,10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.2	32.092	24.83	6.61	0.590	-0.022	104	
1	5	9.23	32.091	24.83					
1	10	9.23	32.094	24.83	6.98	0.623	-0.056	110	
2	20	9.28	32.096	24.83	6.65	0.594	-0.027	105	
2	29	9.15	32.156	24.89	6.54	0.584	-0.015	103	
2	48	8.99	32.492	25.18	5.70	0.509	0.060	89	
2	73	9.15	32.880	25.46	5.23	0.467	0.099	83	
2	97	8.38	33.515	26.07	3.79	0.338	0.235	59	
2	122	8.01	33.432	26.06	3.14	0.280	0.298	48	
2	146	7.68	33.808	26.41	2.82	0.252	0.330	43	
2	170	7.56	33.880	26.48	2.62	0.234	0.349	40	
2	194	7.36	33.944	26.56	2.48	0.221	0.364	38	
2	291	6.23	34.004	26.76	1.87	0.167	0.434	28	

BROWN BEAR CRUISE 318 STATION 007 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL DECK-I
0	0.66	1.39	11.24
6	0.83	0.61	32.075
19	0.81	0.79	32.074
38	0.11	0.28	32.111
			32.241

23.87 25.19 - WATER COLUMN VALUES

MESSENGER TIME 0638 INCOMING SOLAR RADIATION - AM 54 PM 64

BROWN BEAR CRUISE 318 STATION 007				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.22	0.00	32.092	0.000	24.83	312.7	0.000	0.00	6.61	0.00	
10	9.23	0.00	32.094	0.000	24.83	312.8	0.032	0.02	6.98	0.00	
20	9.28	0.00	32.096	0.000	24.83	313.6	0.064	0.07	6.65	0.00	
30	9.14	0.00	32.171	0.003	24.91	306.1	0.095	0.15	6.50	0.01	0.98
50	9.01	0.02	32.519	0.004	25.20	278.7	0.154	0.38	5.67	0.01	0.91
75	9.10	0.02	32.811	0.012	25.51	249.1	0.220	0.81	1.10	0.02	8.85
100	8.32	0.01	33.512	0.022	26.08	195.7	0.276	1.30	3.68	0.01	0.85
150	7.66	0.01	33.831	0.007	26.43	163.4	0.367	2.44	2.78	0.00	0.80
200	7.30	0.00	33.958	0.001	26.58	149.8	0.446	3.85	2.45	0.00	1.93
250	6.77	0.01	34.016	0.001	26.72	137.4	0.518	5.52	2.13	0.01	22.34

BROWN BEAR CRUISE 318 STATION 008 OBSERVED VALUES

DATE 1/03/63 HR 18.6 LAT 48-14 N LONG 126-15 W SNDC 1189 WEA 02 WIND VEL 10 DIR 27
 BAROM 26.8 TEMP DRY 6.6 WET 5.3 RELHU 83 WTRCLR SECDI 18 SEA 2 DIR 27 SWELL 6 DIR 25
 CLOUD TYPE 7 AMT 9 VIS WIRE ANGL (S) 25.10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
					ML/L	MGA/L					
2	0	9.16	32.129	24.87	6.62	0.591	-0.023	104	0.97	7.5	13
2	5	9.18	32.113	24.85	6.57	0.587	-0.018	103	1.01	7.0	13
2	10	9.14	32.109	24.86	6.57	0.587	-0.018	103	0.97	4.4	12
2	19	9.17	32.176	24.91	6.60	0.589	-0.021	104	0.98	7.4	13
2	29	9.16	32.105	24.85	6.61	0.590	-0.022	104	0.96	6.1	12
2	48	9.35	32.298	24.97	6.07	0.542	0.023	96	1.07	8.7	13
2	72	8.92	32.451	25.16	5.31	0.474	0.098	83	1.43	15.8	20
2	96	8.42	32.836	25.54	5.47	0.489	0.087	85	1.38	15.8	20
2	120	8.18	33.493	26.09	3.84	0.343	0.233	60	1.97	26.5	33
2	143	8.06	33.693	26.26	3.23	0.288	0.288	50	2.11	28.9	40
2	167	7.69	33.838	26.43	2.76	0.247	0.335	42	2.24	31.7	44
1	181	7.67	33.861	26.45	3.11	0.278	0.304	48	2.24	32.4	42
1	272	6.52	33.984	26.70	1.76	0.157	0.440	26	2.50	36.4	57
1	461	4.97	34.074	26.97	1.00	0.089	0.531	14	2.84	42.9	84
1	699	4.28	34.254	27.19	0.33	0.029	0.601	5	3.03	44.2	106
1	936	3.57	34.376	27.36	0.29	0.026	0.615	4	2.97	43.5	126

BROWN BEAR CRUISE 318 STATION 008 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.46	1.18	4.24	0.81	100	50	32.107	1.02	7.0	12
4	0.32	0.95	3.44	0.79	59		32.105	1.01	6.2	12
				0.76	33					
13	0.34	0.71	0.94	0.73	22	10	32.128	1.01	6.1	12
35	0.31	1.25	0.02	0.39	13	1	32.102	0.99	5.6	11
100	0.04	0.04		0.10	5		32.743	1.28	10.6	15
150							33.614			

11.60 33.32 45.64 - WATER COLUMN VALUES

MESSANGER TIME 1140 INCOMING SOLAR RADIATION - AM 54 PM 64

LIGHT SATURATION INCUBATOR ILLUMINATION 21300

DEPTH	BROWN BEAR		CRUISE 318		STATION 008		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	9.16	0.00	32.129	0.000	24.87	309.0	0.000	0.00	6.62	0.00	1.23 0.97			
10	9.14	0.00	32.109	0.000	24.86	310.4	0.032	0.02	6.57	0.00				
20	9.17	0.00	32.094	0.007	24.84	312.1	0.063	0.06	6.61	0.00				
30	9.17	0.01	32.113	0.002	24.86	310.9	0.094	0.15	6.59	0.01				
50	9.33	0.01	32.308	0.004	24.98	299.1	0.156	0.40	5.99	0.01	0.91 0.84 0.80 0.75			
75	8.85	0.01	32.485	0.001	25.20	279.2	0.229	0.86	5.35	0.05				
100	8.37	0.00	32.952	0.017	25.63	237.9	0.294	1.44	5.23	0.06				
150	7.94	0.02	33.746	0.002	26.32	173.8	0.398	2.73	3.01	0.04				
200	7.49	0.06	33.891	0.000	26.50	157.4	0.481	4.22	3.06	0.19	1.94 1.44 0.94 0.75			
250	6.87	0.06	33.959	0.000	26.64	144.6	0.557	5.97	2.35	0.21				
300	6.23	0.01	34.003	0.006	26.76	133.6	0.627	7.52	1.55	0.05				
400	5.36	0.01	34.055	0.010	26.91	120.2	0.755	12.52	1.08	0.09				
500	4.81	0.03	34.103	0.003	27.01	111.1	0.872	17.90	0.86	0.01	0.83 0.68 6.72 6.14			
600	4.48	0.06	34.178	0.005	27.10	102.7	0.980	23.98	0.55	0.01				
700	4.28	0.00	34.255	0.000	27.19	95.6	1.080	30.66	0.33	0.00				
800	4.07	0.03	34.321	0.003	27.26	89.1	1.174	37.85	0.22	0.01				

BROWN BEAR CRUISE 318 STATION 009 OBSERVED VALUES
 DATE 1/03/63 HR 22.4 LAT 48-15 N LONG 126-30 W WEA 01 WIND VEL 4 DIR 27
 BAROM 14.6 TEMP DRY 8.1 WET 6.1 RELHU 75 WTRCLR SCA 3 DIR 27 SWELL 4 DIR 27
 CLOUD TYPE VIS WIRE ANGLE(S) 6.10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.34	32.361	25.02	6.68	0.597	-0.031	106	106
1	5	9.34	32.361	25.02	6.69	0.598	-0.032	106	106
1	10	9.29	32.364	25.03	6.69	0.598	-0.032	106	106
1	20	9.32	32.373	25.04	6.72	0.600	-0.035	106	106
1	30	9.31	32.375	25.04	6.71	0.599	-0.034	106	106
1	49	9.38	32.478	25.11	6.65	0.594	-0.030	105	105
1	74	9.14	32.503	25.17	6.60	0.589	-0.022	104	104
1	99	8.92	32.588	25.27	6.18	0.552	0.018	97	97
1	124	7.55	33.045	25.83	5.50	0.491	0.095	84	84
1	148	7.62	33.601	26.25	4.15	0.371	0.213	64	64
1	173	7.20	33.763	26.44	4.32	0.386	0.203	66	66
1	198	7.08	33.874	26.54	3.91	0.349	0.240	59	59
1	299		33.938		2.80	0.250			

BROWN BEAR			CRUISE 318		STATION 009		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.34	0.00	32.361	0.000	25.02	294.5	0.000	0.00	6.68	0.00	
10	9.29	0.00	32.364	0.000	25.03	293.7	0.030	0.02	6.69	0.00	
20	9.32	0.00	32.373	0.000	25.04	293.7	0.060	0.06	6.72	0.00	
30	9.31	0.00	32.375	0.000	25.04	293.5	0.089	0.14	6.71	0.00	
50	9.37	0.00	32.480	0.001	25.11	287.1	0.148	0.38	6.65	0.00	0.95
75	9.14	0.01	32.502	0.002	25.16	282.3	0.219	0.84	6.59	0.00	0.94
100	8.86	0.02	32.602	0.002	25.29	271.2	0.289	1.46	6.16	0.00	0.94
150	7.59	0.01	33.623	0.005	26.27	178.0	0.402	2.85	4.14	0.03	0.89
200			33.881	0.000					3.86	0.01	1.94
250			33.970	0.006					3.44	0.07	21.31

BROWN BEAR CRUISE 318 STATION 010 OBSERVED VALUES
 DATE 2/03/63 HR 01.6 LAT 48-14 N LONG 126-46 W SNGD 2651 WEA 13 WIND VEL 0 DIR 00
 BAROM 22.0 TEMP DRY 7.3 WET 5.7 RELHU 79 WTRCLR SECDI 18 SEA 0 DIR 00 SWELL 2 DIR 30
 CLOUD TYPE 5 VIS 6 WIRE ANGLE(S) 5
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN PHOS NITR
 2 0 9.33 32.471 25.11 6.64 0.593 -0.028 105 0.81 4.3
 2 5 9.38 32.474 25.10 6.73 0.601 -0.037 106 0.89 5.3
 2 10 9.35 32.478 25.11 6.72 0.600 -0.035 106 0.85 5.1
 2 20 9.38 32.479 25.11 6.71 0.599 -0.035 106 0.78 4.0
 2 30 9.36 32.480 25.11 6.70 0.598 -0.034 106 0.86 4.6
 2 49 9.35 32.491 25.12 6.60 0.589 -0.025 104 0.90 5.3
 2 74 9.06 32.514 25.19 5.84 0.522 0.047 92 0.96 6.5
 2 99 8.14 32.879 25.61 5.80 0.518 0.061 89 1.32 13.5
 2 124 7.76 33.163 25.89 5.19 0.464 0.120 79 1.49 16.5
 2 148 7.23 33.538 26.26 4.55 0.406 0.183 69 1.81 24.7
 2 173 7.12 33.794 26.47 4.27 0.381 0.208 65 1.82 25.0
 1 198 7.07 33.865 26.54 4.05 0.362 0.228 61 1.91 27.8
 1 295 5.77 34.060 26.86 2.75 0.246 0.362 40 2.36 35.5
 1 493 4.71 34.106 27.02 0.84 0.075 0.549 12 2.90 32.0
 1 738 4.15 34.301 27.24 0.75 0.067 0.565 11 3.09 45.4
 1 984 3.46 34.408 27.39 0.32 0.029 0.614 4 3.02 44.8
 1 1970 2.54 34.558 27.60 0.79 0.071 0.587 11 2.90 43.5
 1 2562 1.80 34.648 27.73 2.18 0.195 0.475 29

BROWN BEAR CRUISE 318 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.12	0.40		32.467
4	0.21	0.51		32.471
13	0.20	0.42		32.477
35	0.23	0.31		32.472

7.23 14.04 - WATER COLUMN VALUES

MESSSENGER TIME 1700 INCOMING SOLAR RADIATION - AM 54 PM 64

DEPTH	BROWN BEAR		CRUISE 318		STATION 010		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMLY	GEOPT ANOMLY	POI ENERGY	OXY ML/L	E(O)			
0	9.33	0.00	32.471	0.000	25.11	286.2	0.000	0.00	6.64	0.00	0.95 0.94 0.94 0.89		
10	9.35	0.00	32.478	0.000	25.11	286.1	0.029	0.02	6.72	0.00			
20	9.38	0.00	32.479	0.000	25.11	286.7	0.058	0.06	6.71	0.00			
30	9.36	0.00	32.480	0.000	25.11	286.5	0.087	0.13	6.70	0.00			
50	9.35	0.00	32.489	0.002	25.12	286.0	0.145	0.37	6.57	0.01	0.95 0.94 0.94 0.89		
75	9.02	0.01	32.526	0.003	25.20	278.8	0.216	0.83	5.84	0.01			
100	8.12	0.00	32.890	0.001	25.62	239.0	0.281	1.41	5.78	0.00			
150	7.21	0.00	33.564	0.001	26.28	177.1	0.386	2.71	4.52	0.00			
200	7.05	0.01	33.870	0.000	26.54	152.9	0.469	4.19	4.03	0.00	1.03 1.22 0.99 0.78		
250	6.45	0.09	33.985	0.001	26.71	137.2	0.542	5.87	3.38	0.04			
300	5.73	0.01	34.063	0.002	26.87	122.9	0.608	7.72	2.69	0.00			
400	5.04	0.07	34.108	0.024	26.99	112.5	0.727	11.96	1.57	0.03			
500	4.69	0.00	34.111	0.001	27.03	109.2	0.838	17.13	0.82	0.01	0.97 0.68 0.81 0.73		
600	4.42	0.04	34.187	0.010	27.12	101.4	0.945	23.12	0.67	0.12			
700	4.21	0.02	34.269	0.005	27.20	93.8	1.043	29.70	0.69	0.06			
800	3.97	0.01	34.333	0.002	27.28	87.1	1.135	36.74	0.65	0.02			
1000	3.43	0.01	34.412	0.001	27.40	76.7	1.301	51.99	0.30	0.00	1.02 1.31 1.38 1.01		
1200	3.15	0.10	34.460	0.013	27.46	71.3	1.451	68.91	0.17	0.03			
1500	2.82	0.14	34.514	0.019	27.54	65.3	1.658	97.68	0.20	0.05			
2000	2.52	0.01	34.560	0.001	27.60	61.1	1.980	155.37	0.85	0.00			
2500	1.93	0.03	34.632	0.004	27.70	50.4	2.264	220.67	2.01	0.01	0.77		

BROWN BEAR CRUISE 318 STATION 011 OBSERVED VALUES

DATE 2/03/63 HR 05.6 LAT 48-15 N LONG 127-00 W WEA 01 WIND VEL 10 DIR 29
 BAROM 20.0 TEMP DRY 7.2 WET 5.6 RELHU 79 WTRCLR SECDI 2514 SEA 2 DIR 29 SWELL 6 DIR 28
 CLOUD TYPE 3 AMT 4 VIS 7 WIRE ANGLE(S) 9.---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	9.18	32.352	25.04	6.79	0.606	-0.039	107
1	5	9.21	32.346	25.03	6.71	0.599	-0.032	106
1	10	9.18	32.343	25.03	6.71	0.599	-0.032	106
1	20	9.22	32.349	25.03	6.71	0.599	-0.032	106
1	29	9.22	32.354	25.04	6.69	0.598	-0.031	105
1	48	9.31	32.411	25.07	6.64	0.593	-0.027	105
1	72	9.13	32.526	25.18	6.50	0.581	-0.013	102
1	97	8.03	32.723	25.51	5.82	0.520	0.062	89
1	121	7.23	33.159	25.96	5.16	0.461	0.130	78
1	145	7.20	33.622	26.33	4.13	0.369	0.220	63
1	169	7.12	33.812	26.49	4.11	0.367	0.222	62
1	193	6.96	33.909	26.59	3.77	0.337	0.255	57
2	289		33.999		1.94	0.173		

BROWN BEAR CRUISE 318 STATION 011 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0			32.337
4	0.23	0.48	32.339
13	0.20	0.66	32.346
35	0.26	0.76	32.350
100	0.00	0.02	32.839

7.91 23.17 - WATER COLUMN VALUES

MESSANGER TIME 2250 INCOMING SOLAR RADIATION - AM 54 PM 64

DEPTH	BROWN BEAR		CRUISE 318		STATION 011		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.18	0.00	32.352	0.000	25.04	292.8	0.000	0.00	6.79	0.00	0.98	
10	9.18	0.00	32.343	0.000	25.03	293.6	0.030	0.02	6.71	0.00		
20	9.22	0.00	32.349	0.000	25.03	293.9	0.060	0.06	6.71	0.00		
30	9.23	0.00	32.356	0.000	25.04	293.7	0.089	0.14	6.69	0.00		
50	9.32	0.01	32.418	0.000	25.07	290.8	0.148	0.38	6.64	0.01	0.91	
75	9.02	0.02	32.541	0.003	25.21	277.6	0.220	0.84	6.43	0.01	0.85	
100	7.90	0.01	32.770	0.004	25.56	244.9	0.285	1.42	5.75	0.01	0.84	
150	7.19	0.00	33.677	0.005	26.37	168.5	0.390	2.71	4.10	0.04	0.76	
200			33.935	0.002					3.63	0.02	2.14	
250			34.025	0.007					2.79	0.10	21.66	

BROWN BEAR CRUISE 318 STATION 012 OBSERVED VALUES

DATE 2/03/63 HR 09.6 LAT 48-14 N LONG 127-14 W SNRG 2570 WEA 03 WIND VEL 0 DIR 00
 BAROM 19.3 TEMP DRY 8.1 WET 5.8 RELHU 71 WTRCLR SECDI SEA 4 DIR 27 SWELL 4 DIR 27
 CLOUD TYPE VIS WIRE ANGLE(S) ---, 3

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	8.98	32.308	25.04	6.67	0.596	-0.025	104	0.92	0.92	6.7	10
2	5	9.04	32.299	25.02	6.71	0.599	-0.030	105	1.01	0.94	2.6	11
2	10	9.00	32.298	25.03	6.71	0.599	-0.029	105	0.94	0.94	3.2	11
2	20	9.05	32.316	25.03	6.71	0.599	-0.030	105	0.96	0.96	2.3	11
2	30	9.09	32.312	25.02	6.73	0.601	-0.032	106	0.91	0.91	3.7	11
2	49	9.04	32.331	25.05	6.71	0.599	-0.030	105	0.93	0.93	5.0	11
2	74	8.86	32.476	25.19	6.58	0.588	-0.017	103	0.97	0.97	5.4	11
2	99	7.48	33.091	25.87	5.32	0.475	0.112	81	1.55	1.55	9.1	25
2	124	7.83	33.643	26.26	3.68	0.329	0.252	57	2.04	2.04	11.7	38
2	148	7.64	33.798	26.40	3.05	0.272	0.310	47	2.21	2.21	8.3	42
2	173	7.44	33.842	26.47	2.86	0.255	0.329	44	2.24	2.24	9.1	45
1	198	7.33	33.903	26.53	2.55	0.228	0.358	39	2.25	2.25	14.6	45
1	296	6.02	33.982	26.77	2.08	0.186	0.419	31	2.49	2.49	10.0	59
1	493	4.97	34.092	26.98	0.90	0.080	0.540	13	2.83	2.83	17.9	86
1	740	4.09	34.272	27.22	0.34	0.030	0.603	5	2.97	2.97	43.9	112
1	986		34.388		0.33	0.029			2.96	2.96	50.5	129
1	1480	2.58	34.525	27.57	0.72	0.064	0.593	10	2.89	2.89	11.0	150
1	1776	2.29	34.573	27.63	1.15	0.103	0.559	16	2.92	2.92	49.1	154

BROWN BEAR CRUISE 318 STATION 012 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 119 PM 116
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0019-0029 DEPTHS 100, 70
 30, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 012		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	8.98	0.00	32.308	0.000	25.04	293.1	0.000	0.00	6.67	0.00		
10	9.00	0.00	32.298	0.000	25.03	294.3	0.030	0.02	6.71	0.00		
20	9.05	0.00	32.316	0.000	25.03	293.8	0.060	0.06	6.71	0.00		
30	9.09	0.00	32.312	0.000	25.02	294.9	0.089	0.14	6.73	0.00		
50	9.05	0.01	32.331	0.002	25.05	293.2	0.149	0.38	6.72	0.01	0.95	
75	8.80	0.02	32.497	0.003	25.21	277.6	0.220	0.84	6.54	0.00	0.94	
100	7.48	0.01	33.118	0.002	25.89	213.3	0.282	1.38	5.25	0.01	0.94	
150	7.62	0.00	33.803	0.002	26.41	165.0	0.378	2.58	3.03	0.01	0.89	
200	7.31	0.01	33.906	0.001	26.54	153.8	0.458	4.01	2.53	0.00	1.03	
250	6.69	0.08	33.962	0.010	26.66	142.1	0.533	5.73	2.23	0.05	1.23	
300	5.99	0.01	33.984	0.000	26.77	132.0	0.602	7.68	2.05	0.00	0.99	
400	5.31	0.08	34.042	0.004	26.90	120.6	0.729	12.23	1.44	0.04	0.77	
500	4.94	0.00	34.097	0.001	26.99	113.1	0.847	17.67	0.87	0.00	0.97	
600	4.55	0.01	34.171	0.005	27.09	104.0	0.957	23.85	0.56	0.02	0.68	
700	4.21	0.01	34.243	0.002	27.18	95.7	1.058	30.58	0.38	0.01	0.80	
800	3.92	0.01	34.305	0.001	27.26	88.6	1.151	37.75	0.31	0.01	1.04	
1000	3.40	0.02	34.393	0.000	27.39	77.7	1.319	53.22	0.33	0.00	1.24	
1200	2.99	0.02	34.460	0.002	27.48	69.5	1.468	70.02	0.44	0.01	1.22	
1500	2.56	0.00	34.529	0.000	27.57	61.2	1.667	97.46	0.75	0.00	1.00	

BROWN BEAR CRUISE 318 STATION 013 OBSERVED VALUES

DATE 2/03/63 HR 13.9 LAT 48-14 N LONG 127-30 W WEA 01 WIND VEL 12 DIR 01
BAROM 18.3 TEMP DRY 6.4 WET 5.0 RELHU 81 WTRCLR SECDI 2560
CLOUD TYPE 6 AMT 6 VIS WIRE ANGLE(S) 10, --- SEA 2 DIR 30 SWELL 1 DIR 27

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	8.99	32.222	24.97	6.68	0.597	-0.026		105
1	5	9.00	32.213	24.96	6.70	0.598	-0.028		105
2	10	9.02	32.219	24.96	6.75	0.603	-0.033		106
2	20	9.05	32.244	24.98	6.72	0.600	-0.031		105
2	30	9.06	32.241	24.97	6.71	0.599	-0.030		105
2	49	9.09	32.248	24.97	6.71	0.599	-0.030		105

BROWN BEAR CRUISE 318 STATION 013 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.18	0.87	4.06	32.229
4	0.22	0.39		32.219
13	0.21	0.48		32.216
35	0.19	0.53		32.227
100	0.18	0.29		32.244
7.23	17.55	-	WATER COLUMN VALUES	

MESSANGER TIME 0610 INCOMING SOLAR RADIATION - AM 119 PM 116

BROWN BEAR		CRUISE 318		STATION 013		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.99	0.00	32.222	0.000	24.97	299.6	0.000	0.00	6.68	0.00	
10	9.02	0.00	32.219	0.000	24.96	300.4	0.031	0.02	6.75	0.00	
20	9.05	0.00	32.244	0.000	24.98	299.2	0.061	0.06	6.72	0.00	
30	9.06	0.00	32.241	0.000	24.97	299.7	0.091	0.14	6.71	0.00	

BROWN BEAR CRUISE 318 STATION 014 OBSERVED VALUES

DATE 2/03/63 HR 16.6 LAT 48-13 N LONG 127-45 W SNOG 2496 WEA 01 WIND VEL 12 DIR 36
 BAROM 20.3 TEMP DRY 7.3 WET 5.0 RELHU 70 WTRCLR SECDI 20 SEA 1 DIR 36 SWELL 3 DIR 32
 CLOUD TYPE 8 AMT 4 VIS 8 WIRE ANGLE(S) 22, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ML/L	AOU	SATN
2	0	8.94	32.301	25.04	6.77	0.605	-0.034	106	
2	4	8.94	32.321	25.05	6.73	0.601	-0.030	105	
2	9	8.94	32.299	25.04	6.76	0.604	-0.033	106	
2	18	8.99	32.297	25.03	6.70	0.598	-0.028	105	
2	28	8.96	32.317	25.05	6.72	0.600	-0.030	105	
2	46	8.86	32.372	25.11	6.66	0.595	-0.023	104	
2	69	8.49	32.966	25.63	5.13	0.458	0.116	80	
2	93	7.92	33.394	26.05	4.14	0.370	0.210	64	
2	116	7.70	33.753	26.36	3.04	0.272	0.310	47	
2	139	7.52	33.624	26.44	2.63	0.235	0.349	40	
2	163	7.38	33.869	26.50	2.44	0.218	0.368	37	
1	183	7.38	33.889	26.51	2.36	0.211	0.375	36	
1	271	6.76	33.990	26.68	2.30	0.205	0.388	35	
1	460	5.39	34.063	26.91	1.20	0.107	0.506	17	
1	694	4.36	34.210	27.14	0.41	0.037	0.592	6	
1	929	3.67	34.359	27.33	0.28	0.025	0.614	4	
1	1397	2.71	34.500	27.53	0.59	0.053	0.602	8	
1	1678	2.28	34.573	27.63	0.99	0.088	0.573	13	

BROWN BEAR CRUISE 318 STATION 014 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHDS	NITR	SIL
0	0.24	0.63	3.18			50	32.287	0.97	5.6	10
8	0.16	0.50	1.82			10	32.288	1.02	5.4	10
29	0.22	0.70	0.44			1	32.287	0.96	4.3	8
47	0.21	0.34	0.12	0.51	100		32.320	1.04	6.1	10
				0.55	80					
				0.53	44					
				0.38	22					
				0.24	14					
100	0.02	0.03		0.04	5					
150	0.02						33.471	2.10	26.6	32
200	0.00						33.843	2.61	27.2	28
							33.920	2.41	29.2	37

9.46 26.43 48.76 - WATER COLUMN VALUES

MESSANGER TIME 1204 INCOMING SOLAR RADIATION - AM 119 PM 116

LIGHT SATURATION INCUBATOR ILLUMINATION 20200

DEPTH	BROWN BEAR	STATION 014			INTERPOLATED AND COMPUTED VALUES							VAR RATIO
		TEMP	E (T)	SAL	E (S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E (O)	
0	8-94	0-00		32-301	0-000	25-04	293-0	0-000	0-00	6-77	0-00	
10	8-95	0-00		32-297	0-000	25-03	293-5	0-030	0-02	6-76	0-00	0-93
20	8-99	0-00		32-300	0-000	25-03	294-1	0-060	0-06	6-70	0-00	0-78
30	8-95	0-00		32-314	0-006	25-05	292-8	0-089	0-14	6-74	0-01	0-93
50	8-81	0-00		32-461	0-018	25-18	280-1	0-147	0-37	6-43	0-05	0-82
75	8-34	0-01		33-085	0-004	25-14	227-3	0-211	0-77	4-86	0-02	0-73
100	7-83	0-00		33-521	0-008	26-16	188-1	0-263	1-24	3-78	0-03	0-69
150	7-44	0-00		33-848	0-000	26-47	159-2	0-351	2-34	2-52	0-01	0-67
200	7-31	0-02		33-909	0-001	26-54	153-6	0-429	3-76	2-34	0-02	1-40
250	6-98	0-03		33-964	0-002	26-63	145-8	0-505	5-50	2-31	0-03	1-11
300	6-57	0-01		34-004	0-004	26-71	138-0	0-576	7-51	2-18	0-03	0-94
400	5-82	0-02		34-047	0-008	26-84	126-5	0-710	12-28	1-61	0-06	0-74
500	5-17	0-01		34-086	0-001	26-95	116-8	0-833	17-94	1-02	0-00	0-82
600	4-71	0-02		34-147	0-002	27-05	107-7	0-946	24-33	0-65	0-00	0-68
700	4-34	0-00		34-214	0-000	27-15	99-4	1-051	31-30	0-40	0-00	0-97
800	4-02	0-01		34-280	0-002	27-23	91-6	1-147	38-73	0-30	0-02	0-61
1000	3-50	0-01		34-388	0-004	27-37	79-2	1-320	54-61	0-29	0-01	0-93
1200	3-06	0-01		34-455	0-007	27-47	70-7	1-472	71-72	0-39	0-01	0-88
1500	2-55	0-00		34-523	0-003	27-57	61-4	1-673	99-46	0-73	0-01	0-87

BROWN BEAR CRUISE 318 STATION 015 OBSERVED VALUES

DATE 2/03/63 HR 22.3 LAT 48-14 N LONG 127-58 W SNRG 2500 WEA 01 WIND VEL 12 DIR 36
 BAROM 24.7 TEMP DRY 7.8 WET 6.0 RELHU 77 WTRCLR SECDI 17 SEA 2 DIR 35 SWELL 1 DIR 32
 CLOUD TYPE 7 AMT 2 VIS 9 WIRE ANGLE(S) --,--,15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	9.02	32.284	25.01	6.69	0.598	-0.028	105	0.88	8.6	11	11
2	5	9.04	32.285	25.01	6.79	0.606	-0.037	106	0.79	0.6	11	11
2	10	9.03	32.282	25.01	6.75	0.603	-0.033	106	0.91	0.7	9	9
3	20	9.04	32.292	25.02	6.78	0.606	-0.036	106	0.93	2.0	11	11
3	30	9.01	32.283	25.01	6.71	0.599	-0.029	105	0.91	5.4	12	12
3	49	8.90	32.390	25.11	6.55	0.585	-0.014	102	0.85	4.1	11	11
3	74	8.45	32.600	25.35	6.18	0.552	0.024	96	1.12	3.2	13	13
3	98	8.02	33.482	26.10	3.78	0.338	0.241	58	1.89	18.7	35	35
3	123	7.70	33.765	26.37	2.82	0.252	0.332	43	2.16	17.9	38	38
3	147	7.61	33.818	26.42	2.53	0.226	0.357	39	2.35	21.8	46	46
3	172	7.50	33.874	26.48	2.26	0.202	0.384	34	2.39	35.7	50	50
1	192	7.42	33.904	26.52	2.16	0.193	0.392	33	2.18	18.7	40	40
1	288	6.71	33.973	26.67	2.13	0.190	0.404	32	2.35	9.1	43	43
1	483	5.02	34.077	26.96	0.99	0.088	0.531	14	2.76	19.6	87	87
1	727	4.16	34.278	27.22	0.37	0.033	0.599	5	2.99	35.0	107	107
1	974	3.45	34.394	27.38	0.33	0.029	0.613	5	2.80	39.0	101	101
1	1468	3.20	34.473	27.47	0.49	0.044	0.603	7	2.96	46.5	115	115
1	1764	2.26	34.558	27.62	1.03	0.092	0.570	14	2.93	11.7	144	144

BROWN BEAR CRUISE 318 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.35		32.294
8	0.32	0.93	32.295
29	0.35	0.69	32.284
47	0.19	0.23	32.397
100	0.06	0.01	33.447

14.47 32.73 - WATER COLUMN VALUES

MESSENGER TIME 1626 INCOMING SOLAR RADIATION - AM 119 PM 116

DEPTH	BROWN BEAR		CRUISE 318		STATION 015		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.02	0.00	32.284	0.000	25.01	295.4	0.000	0.00	6.69	0.00	0.95 0.94 0.89 0.85		
10	9.03	0.00	32.282	0.000	25.01	295.9	0.030	0.02	6.75	0.00			
20	9.04	0.00	32.292	0.000	25.02	295.5	0.060	0.06	6.78	0.00			
30	9.01	0.00	32.283	0.000	25.01	295.9	0.090	0.14	6.71	0.00			
50	8.89	0.00	32.391	0.004	25.12	286.3	0.148	0.38	6.56	0.01	1.21 1.41 0.97 0.76		
75	8.43	0.00	32.636	0.008	25.38	261.9	0.218	0.82	6.09	0.02			
100	7.99	0.00	33.521	0.005	26.14	190.3	0.274	1.32	3.66	0.01			
150	7.60	0.00	33.825	0.003	26.43	163.0	0.364	2.44	2.49	0.00			
200	7.37	0.01	33.912	0.001	26.53	154.2	0.443	3.87	2.15	0.01	0.92 0.67 0.85 0.69		
250	7.03	0.02	33.954	0.004	26.61	147.2	0.519	5.63	2.12	0.04			
300	6.60	0.01	33.979	0.001	26.69	140.2	0.592	7.67	2.07	0.02			
400	5.71	0.05	34.033	0.004	26.85	126.1	0.726	12.47	1.53	0.08			
500	4.93	0.01	34.091	0.002	26.98	114.5	0.847	18.03	0.92	0.00	0.97 0.89 12.09		
600	4.51	0.05	34.174	0.007	27.10	104.4	0.957	24.19	0.60	0.01			
700	4.22	0.02	34.256	0.003	27.19	94.8	1.057	30.87	0.40	0.01			
800	3.92	0.01	34.320	0.001	27.28	87.5	1.149	37.96	0.32	0.02			
1000	3.44	0.03	34.400	0.002	27.39	77.6	1.316	53.33	0.32	0.01	0.97 0.89 12.09		
1200	3.34	0.13	34.438	0.012	27.43	75.1	1.471	70.83	0.33	0.03			
1500	3.16	0.01	34.478	0.001	27.48	72.0	1.695	101.89	0.53	0.00			

BROWN BEAR CRUISE 318 STATION 016 OBSERVED VALUES

DATE 3/03/63 HR 10.0 LAT 47-14 N LONG 128-00 W SNDC 2553 WEA 02 WIND VEL 12 DIR 35
 BAROM 26.8 TEMP DRY 7.7 WET 5.9 RELHU 77 WT CLR SEA 1 DIR 29 SWELL 4 DIR 29
 CLOUD TYPE VIS 6 WIRE ANGLE(S) 5, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MG/L	AOU	SATN	PHOS	NITR	SIL
2	0	8.82	32.445	25.17	6.69	0.598	-0.026	104	0.97	3.7	11	
2	5	8.94	32.443	25.15	6.71	0.599	-0.029	105	0.99	1.9	12	
2	10	8.94	32.438	25.15	6.69	0.598	-0.027	105	0.96	1.7	10	
2	20	8.96	32.447	25.15	6.71	0.599	-0.029	105	0.84	2.1	11	
2	30	8.95	32.428	25.14	6.64	0.593	-0.023	104	0.94	3.9	12	
2	49	8.97	32.427	25.13	6.67	0.596	-0.026	105	0.95	3.1	10	
2	79	8.68	32.464	25.21	6.54	0.584	-0.011	102	1.02	2.8	11	
2	99	7.50	33.178	25.94	4.92	0.439	0.147	75	1.60	10.2	29	
2	124	7.41	33.513	26.21	4.14	0.370	0.217	63	1.83	10.6	33	
2	148	7.22	33.876	26.52	3.63	0.324	0.264	55	1.98	7.3	40	
2	174	6.88	33.910	26.60	3.31	0.296	0.297	50	2.02	10.5	47	
1	198	6.54	33.927	26.66	3.27	0.292	0.305	49	2.14	11.7	47	
1	297	5.50	33.988	26.84	1.86	0.166	0.446	27	2.19	5.0	36	
1	494	4.67	34.133	27.05	0.68	0.061	0.564	10	2.79	22.9	96	
1	741	3.93	34.341	27.29	0.45	0.040	0.595	6	3.06	49.4	117	
1	990	3.37	34.419	27.41	0.62	0.055	0.589	9	2.96	46.9	133	
1	1485	2.54	34.493	27.54	0.54	0.048	0.609	7	2.94	51.8	148	
1	1785	2.13	34.578	27.65	1.22	0.109	0.555	16	2.90	8.7	166	

BROWN BEAR CRUISE 318 STATION 016 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0		0.37		32.431
8	0.25	0.36		32.455
29	0.22	0.43		32.436
47	0.19	0.29		32.436
100	0.03	0.02		33.222

10.62 17.84 - WATER COLUMN VALUES

MESSENGER TIME 0344 INCOMING SOLAR RADIATION - AM 110 PM 92

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0032-0042 DEPTMS 100: 70
30: 0

BROWN BEAR			CRUISE 318			STATION 016			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	8.82	0.00	32.445	0.000	25.17	280.5	0.000	0.00	6.69	0.00					
10	8.94	0.00	32.438	0.000	25.15	283.0	0.029	0.02	6.69	0.00					
20	8.96	0.00	32.447	0.000	25.15	282.8	0.057	0.06	6.71	0.00					
30	8.95	0.00	32.428	0.000	25.14	284.2	0.086	0.13	6.64	0.00					
50	8.98	0.01	32.418	0.006	25.12	285.7	0.143	0.37	6.69	0.01	0.97				
75	8.78	0.03	32.422	0.023	25.16	282.9	0.215	0.83	6.64	0.05	0.88				
100	7.48	0.01	33.197	0.004	25.96	207.4	0.277	1.37	4.87	0.01	0.95				
150	7.20	0.00	33.886	0.004	26.54	153.0	0.368	2.50	3.60	0.00	0.90				
200	6.51	0.00	33.928	0.000	26.66	141.6	0.442	3.83	3.25	0.01	1.04				
250	5.93	0.01	33.959	0.001	26.76	132.5	0.511	5.42	2.62	0.11	1.31				
300	5.48	0.00	33.990	0.000	26.84	125.3	0.576	7.25	1.83	0.00	0.99				
400	4.95	0.06	34.061	0.001	26.96	114.9	0.697	11.59	1.05	0.05	0.77				
500	4.65	0.00	34.139	0.001	27.05	106.6	0.809	16.74	0.66	0.00	0.97				
600	4.32	0.01	34.228	0.007	27.16	97.1	0.912	22.53	0.47	0.04	0.68				
700	4.03	0.00	34.310	0.004	27.26	88.7	1.006	28.79	0.43	0.02	0.80				
800	3.78	0.00	34.367	0.003	27.33	82.5	1.092	35.45	0.48	0.02	0.74				
1000	3.35	0.00	34.411	0.001	27.41	75.1	1.252	50.15	0.61	0.01	0.99				
1200	2.98	0.01	34.452	0.008	27.47	70.0	1.399	66.74	0.53	0.08	0.89				
1500	2.52	0.00	34.496	0.001	27.55	63.2	1.601	94.76	0.55	0.01	1.00				

BROWN BEAR CRUISE 318 STATION 16A BIOLOGICAL DATA

DATE 3/03/63 LAT 47-16 N LONG 127-52 W

DEPTH CHL-A PRODUCTIVITY SAL
LAB-I DECK-I

0 0.70 5.34 32.393

MESSENGER TIME 0552 INCOMING SOLAR RADIATION - AM 110 PM 92

BROWN BEAR CRUISE 318 STATION 017 OBSERVED VALUES
 DATE 3/03/63 HR 14.6 LAT 47-14 N LONG 127-45 W SMOG 2615 WEA SEA 2 DIR 34 SWELL 1 DIR 33
 BAROM 28.1 TEMP DRY 7.5 WET 5.0 RELHU 72 WTRCLR
 CLOUD TYPE 6 AMT 6 VIS 9 WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	8.92	32.398	25.12	6.71	0.599	-0.029		105
1	5	8.94	32.400	25.12	6.75	0.603	-0.032		106
1	10	8.94	32.396	25.11	6.77	0.605	-0.034		106
1	19	8.95	32.397	25.11	6.83	0.610	-0.040		107
1	29	8.94	32.409	25.12	6.87	0.614	-0.043		108
1	47	8.79	32.447	25.18	6.67	0.596	-0.024		104
1	71	8.47	32.560	25.31	6.33	0.565	0.011		98
1	94	7.40	33.241	26.00	4.84	0.432	0.156		74
1	119	7.45	33.674	26.33	3.91	0.349	0.236		60
1	142	7.27	33.850	26.50	3.46	0.309	0.278		53
1	166	6.98	33.915	26.59	3.11	0.278	0.313		47
1	190	6.66	34.012	26.71	2.80	0.250	0.345		42
1	284	5.71	34.009	26.83	1.64	0.146	0.463		24

BROWN BEAR CRUISE 318 STATION 017 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.18	0.57	32.393
8	0.19	0.42	32.398
29	0.29	0.54	32.401
47	0.18	0.24	32.427
100	0.00	0.00	33.255

10.71 21.05 - WATER COLUMN VALUES

MESSENGER TIME 0705 INCOMING SOLAR RADIATION - AM 110 PM 92

DEPTH	BROWN BEAR		CRUISE 318		STATION 017		INTERPOLATED AND COMPUTED VALUES						
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	8.92	0.00	32.398	0.000	25.12	285.5	0.000	0.00	6.71	0.00			
10	8.94	0.00	32.396	0.000	25.11	286.1	0.029	0.02	6.77	0.00			
20	8.95	0.00	32.398	0.000	25.11	286.3	0.058	0.06	6.84	0.00	0.88		
30	8.93	0.00	32.410	0.000	25.12	285.3	0.087	0.13	6.86	0.00	0.97		
50	8.78	0.01	32.442	0.010	25.17	280.9	0.144	0.37	6.66	0.02	0.87		
75	8.27	0.04	32.668	0.020	25.43	257.3	0.212	0.80	6.09	0.04	0.78		
100	7.37	0.05	33.371	0.002	26.11	192.8	0.268	1.30	4.56	0.01	0.75		
150	7.18	0.00	33.877	0.006	26.53	153.5	0.356	2.39	3.33	0.00	0.69		
200	6.53	0.00	34.011	0.020	26.73	135.6	0.428	3.69	2.68	0.00	14.07		
250	5.93	0.02	34.050	0.020	26.83	125.7	0.494	5.21	2.09	0.01	58.35		

BROWN BEAR CRUISE 318 STATION 018 OBSERVED VALUES
 DATE 3/03/63 MR 16.9 LAT 47-14 N LONG 127-29 W SMDG 2561 WEA 02 WIND VEL 6 DIR 34
 BAROM 28.1 TEMP DRY 7.4 WET 4.8 RELHU 67 WTRCLR SEA 2 DIR 34 SWELL 1 DIR 36
 CLOUD TYPE 6 AMT 6 VIS WIRE ANGLE(S) 16.5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L		OXYGEN		SATM
					MGA/L	AOU			
2	0	9.01	32.395	25.10	6.75	0.603	-0.033	106	
2	5	9.04	32.406	25.11	6.75	0.603	-0.034	106	
2	10	9.03	32.389	25.09	6.76	0.604	-0.034	106	
2	20	9.04	32.390	25.09	6.76	0.604	-0.035	106	
2	30	9.03	32.390	25.09	6.77	0.605	-0.035	106	
2	49	9.03	32.395	25.10	6.73	0.601	-0.032	106	
2	74	8.74	32.505	25.23	6.39	0.571	0.002	100	
2	99	7.58	33.040	25.80	5.18	0.463	0.122	79	
2	124	7.38	33.544	26.24	4.28	0.382	0.205	65	
2	148	7.31	33.745	26.41	3.98	0.355	0.232	61	
2	173	7.05	33.860	26.54	3.76	0.336	0.254	57	
1	194	6.78	33.926	26.62	3.54	0.316	0.278	53	
1	290	5.59	33.956	26.80	2.05	0.183	0.428	30	
1	485	4.72	34.113	27.03	0.78	0.070	0.554	11	
1	728	3.82	34.236	27.22	0.38	0.034	0.604	5	
1	972	3.31	34.373	27.38	0.29	0.026	0.619	4	
1	1460	2.54	34.567	27.63	0.62	0.055	0.561	15	
1	1757	2.17			1.15	0.103			

BROWN BEAR CRUISE 318 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	SAL
0	0.22	0.51		32.395
8	0.21	0.53		32.390
29	0.18	0.59		32.392
47	0.23	0.41		32.399
100	0.00	0.01		33.125

9.61 24.88 - WATER COLUMN VALUES

MESSENGER TIME 0945 INCOMING SOLAR RADIATION - AM 110 PM 92

DEPTH	BROWN BEAR		CRUISE 318		STATION 018		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	9.01	0.00	32.395	0.000	25.10	287.0	0.000	0.00	6.75	0.00		
10	9.03	0.00	32.389	0.000	25.09	287.9	0.029	0.02	6.76	0.00		
20	9.04	0.00	32.390	0.000	25.09	288.2	0.058	0.06	6.76	0.00		
30	9.03	0.00	32.390	0.000	25.09	288.2	0.088	0.13	6.77	0.00		
50	9.03	0.00	32.394	0.002	25.10	288.2	0.146	0.37	6.73	0.00	0.95	
75	8.70	0.01	32.523	0.003	25.25	274.2	0.216	0.82	6.35	0.01	0.94	
100	7.66	0.00	33.063	0.002	25.83	219.7	0.279	1.38	5.14	0.00	0.94	
150	7.29	0.00	33.757	0.001	26.42	163.9	0.375	2.58	3.96	0.00	0.89	
200	6.70	0.00	33.934	0.005	26.64	143.5	0.453	3.96	3.45	0.01	1.14	
250	6.05	0.02	33.969	0.019	26.75	133.3	0.523	5.57	2.68	0.06	1.37	
300	5.52	0.02	33.963	0.001	26.81	127.8	0.588	7.42	1.95	0.01	0.98	
400	4.96	0.08	34.040	0.007	26.94	116.6	0.712	11.83	1.14	0.06	0.76	
500	4.66	0.00	34.122	0.001	27.04	107	0.825	17.05	0.73	0.01	0.93	
600	4.26	0.01	34.175	0.004	27.13	100	0.930	22.98	0.49	0.04	0.67	
700	3.91	0.00	34.224	0.002	27.20	73.5	1.028	29.51	0.38	0.02	0.85	
800	3.64	0.01	34.278	0.002	27.27	87.5	1.120	36.56	0.33	0.00	0.69	
1000	3.26	0.00	34.388	0.001	27.40	76.4	1.286	51.81	0.29	0.00	6.86	
1200	2.92	0.01	34.488	0.007	27.51	66.5	1.430	68.11	0.36	0.00	26.49	
1500	2.49	0.00	34.529	0.011	27.58	60.3	1.623	94.81	0.68	0.00	11.85	

BROWN BEAR CRUISE 318 STATION 019 OBSERVED VALUES									
DATE 3/03/63		HR 20.3	LAT 47-14 N	LONG 127-15 W	SNDG 2560	WEA 03	WIND VEL 5 DIR 34		
BAROM 28.4		TEMP DRY 8.5	WET 5.6	RELHU 64	WTRCLR	SECDI 19	SEA 3	DIR 32	SWELL 1 DIR 34
CLOUD TYPE 2 AMT 6		VIS	WIRE ANGLE(S) 3						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN	
1	0	9.05	32.414	25.11	6.73	0.601	-0.032	106	
1	5	9.07	32.391	25.09	6.77	0.605	-0.036	106	
1	10	9.02	32.389	25.09	6.79	0.606	-0.037	107	
1	20	8.99	32.391	25.10	6.55	0.585	-0.015	103	
1	30	8.98	32.401	25.11	6.76	0.604	-0.034	106	
1	48	8.96	32.408	25.12	6.71	0.599	-0.029	105	
1	73	8.62	32.473	25.22	6.60	0.589	-0.015	103	
1	98	7.88	32.937	25.69	5.44	0.486	0.097	83	
1	122	7.39	33.424	26.15	4.53	0.405	0.183	69	
1	146	7.27	33.699	26.38	3.87	0.346	0.242	59	
1	171	6.82	33.786	26.51					
1	195	6.73	33.897	26.61					
1	291	5.54	33.947	26.80	2.15	0.192	0.420	31	

BROWN BEAR CRUISE 318 STATION 020 OBSERVED VALUES									
DATE 3/03/63		HR 22.8	LAT 47-14 N	LONG 127-01 W	SEA 02	WIND VEL 4 DIR 33	SEA 1 DIR 32	SWELL 1 DIR 34	
BAROM 29.5		TEMP DRY 8.5	WET 5.1	RELHU 58	WTRCLR	SNDG 2542	SECDI		
CLOUD TYPE 2 AMT 7		VIS 8	WIRE ANGLE(S) --, 0						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	9.80	32.518	25.07	6.61	0.590	-0.032		106
2	5	9.76	32.529	25.09	6.51	0.581	-0.022		104
2	10	9.74	32.520	25.08	6.54	0.584	-0.024		104
2	20	9.72	32.522	25.09	6.51	0.581	-0.022		104
2	30	9.73	32.522	25.09	6.54	0.584	-0.024		104
2	49	9.67	32.511	25.09	6.54	0.584	-0.024		104
2	74	9.56	32.519	25.11	6.52	0.582	-0.020		104
2	99	7.67	32.902	25.70	5.87	0.524	0.061		90
2	124	7.36	33.435	26.16	4.68	0.418	0.170		71
2	148	7.40	33.717	26.37	3.94	0.352	0.234		60
2	173	7.16	33.843	26.51	3.77	0.337	0.252		57
1	186	7.06			3.69	0.330			
1	280	5.66			2.97	0.265			
1	472	4.53			1.02	0.091			
1	713	4.02	34.259	27.22	0.33	0.029	0.605		5
1	957	3.43			0.33	0.029			
1	1446	3.07	34.509	27.51	0.75	0.067	0.582		10
1	1740	2.14	34.568	27.64	1.15	0.103	0.562		15

DEPTH	BROWN BEAR		CRUISE 318		STATION 020		INTERPOLATED AND COMPUTED VALUES				
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.80	0.00	32.518	0.000	25.07	289.9	0.000	0.00	6.61	0.00	
10	9.74	0.00	32.520	0.000	25.08	289.0	0.030	0.02	6.54	0.00	
20	9.72	0.00	32.522	0.000	25.09	288.8	0.059	0.06	6.51	0.00	
30	9.73	0.00	32.522	0.000	25.09	289.1	0.088	0.13	6.54	0.00	
50	9.68	0.01	32.507	0.002	25.08	289.8	0.146	0.37	6.55	0.00	0.95
75	9.49	0.02	32.529	0.001	25.13	285.6	0.219	0.84	6.51	0.00	0.94
100	7.64	0.01	32.924	0.003	25.72	229.8	0.284	1.41	5.82	0.01	0.94
150	7.38	0.00	33.730	0.002	26.39	167.1	0.384	2.66	3.91	0.01	0.92
200	6.87	0.04	33.918	0.033	26.61	147.0	0.463	4.07	3.60	0.00	2.35
250	6.14	0.06	34.043	0.086	26.80	128.9	0.532	5.66	3.22	0.00	6.24
300	5.47	0.03	34.148	0.126	26.97	113.5	0.593	7.38	2.75	0.03	10.62
400	4.78	0.07	34.298	0.171	27.17	95.2	0.699	11.12	1.72	0.07	16.46
500	4.45	0.02	34.370	0.168	27.26	87.1	0.791	15.36	0.87	0.02	14.96
600	4.20	0.04	34.362	0.116	27.28	85.8	0.878	20.29	0.49	0.05	7.36
700	4.04	0.01	34.276	0.016	27.23	91.2	0.968	26.29	0.33	0.01	1.08
800	3.80	0.01	34.302	0.004	27.27	87.5	1.058	33.25	0.28	0.02	0.90
1000	3.41	0.03	34.387	0.009	27.38	78.2	1.226	48.68	0.35	0.00	0.96
1200	3.28	0.11	34.453	0.008	27.45	73.3	1.379	66.01	0.48	0.01	0.98
1500	2.98	0.02	34.520	0.001	27.53	66.8	1.592	95.49	0.82	0.00	0.97

BROWN BEAR CRUISE 318 STATION 021 OBSERVED VALUES

DATE 4/03/63 HR 03.5 LAT 47-14 N LONG 126-47 W SNOG 2651 WEA 00 WIND VEL 0 DIR 00
 BAROM 29.5 TEMP DRY 8.2 WET 5.0 RELHU 61 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 33
 CLOUD TYPE 6 AMT 3 VIS 7 WIRE ANGLE(S) 3.00

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.69	32.512	25.08	6.64	0.593	-0.033	0.033	106
1	5	9.72	32.512	25.08	6.66	0.595	-0.035	0.035	106
1	10	9.68	32.508	25.08	6.64	0.593	-0.033	0.033	106
1	20	9.66	32.508	25.09	6.65	0.594	-0.033	0.033	106
1	29	9.64	32.509	25.09	6.64	0.593	-0.032	0.032	106
1	48	9.63	32.511	25.09	6.55	0.585	-0.024	0.024	104
1	73	9.08	32.496	25.17	6.48	0.579	-0.011	0.011	102
1	97	7.74	32.857	25.65	5.98	0.534	0.051	0.051	91
1	121	7.14	33.275	26.06	5.16	0.461	0.131	0.131	78
1	145	7.06	33.572	26.31	4.60	0.411	0.180	0.180	69
1	169	6.92	33.780	26.49	4.40	0.393	0.199	0.199	66
1	193	6.84	33.897	26.59	3.68	0.329	0.264	0.264	55
1	278	5.67	33.920	26.76	2.74	0.245	0.365	0.365	40

BIOLOGICAL DATA

BROWN BEAR CRUISE 318 STATION 021

DEPTH	CHL-A	PRODUCTIVITY	SAL
		LAB-I	DECK-I

0	0.12	0.23	32.521
5	0.13	0.21	32.522
19	0.14	0.19	32.520
48	0.21	0.20	32.512
100	0.01		32.729

7.53 9.69 - WATER COLUMN VALUES

MESSANGER TIME 1905 INCOMING SOLAR RADIATION - AM 110 PM 92

DEPTH	BROWN BEAR		CRUISE 318		STATION 021		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.69	0.00	32.512	0.000	25.08	288.7	0.000	0.00	6.64	0.00		
10	9.68	0.00	32.508	0.000	25.08	289.0	0.030	0.02	6.64	0.00		
20	9.66	0.00	32.508	0.000	25.09	288.8	0.059	0.06	6.65	0.00		
30	9.64	0.00	32.509	0.000	25.09	288.7	0.088	0.13	6.64	0.00	0.98	
50	9.61	0.00	32.503	0.005	25.09	289.0	0.146	0.37	6.55	0.01	0.91	
75	8.97	0.02	32.518	0.004	25.20	278.6	0.217	0.83	6.45	0.00	0.88	
100	7.63	0.00	32.911	0.003	25.71	230.6	0.282	1.40	5.88	0.01	0.84	
150	7.03	0.00	33.623	0.000	26.35	170.3	0.383	2.66	4.56	0.02	0.76	
200	6.81	0.01	33.917	0.002	26.61	146.3	0.462	4.08	3.43	0.03	10.53	
250	6.35	0.05	33.995	0.010	26.74	135.2	0.533	5.71	2.16	0.20	40.96	

BROWN BEAR CRUISE 318 STATION 022 OBSERVED VALUES

DATE 4/03/63 HR 05.7 LAT 47-14 N LONG 126-32 W SNOG 2469 WEA 02 WIND VEL 0 DIR 00
 BAROM 29.1 TEMP DRY 8.6 WET 5.4 RELHU 62 WTRCLR SECDI SEA 1 DIR 36 SWELL 1 DIR 36
 CLOUD TYPE 2 AMT 3 VIS 7 WIRE ANGLE(S) 5.3

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ACU	SATN	PHOS	NITR	SIL
2	0	9.60	32.500	25.09	8.15	0.728	-0.166	130	0.88	0.88	1.6	8
2	5	9.62	32.509	25.09	8.06	0.720	-0.159	128	0.87	0.87	1.6	9
2	10	9.58	32.496	25.09	8.09	0.723	-0.161	129	0.97	0.97	1.5	7
2	20	9.57	32.500	25.09	7.58	0.677	-0.115	120	0.85	0.85	1.5	7
2	30	9.58	32.500	25.09	7.14	0.638	-0.076	114	0.85	0.85	1.4	10
2	49	9.58	32.506	25.10	7.98	0.713	-0.151	127	0.86	0.86	1.6	7
2	74	9.26	32.509	25.15	6.74	0.602	-0.036	106	0.91	0.91	1.4	9
2	99	8.74	32.658	25.35	6.70	0.598	-0.026	105	1.11	1.11	1.6	15
2	124	7.60	33.169	25.92	5.39	0.481	0.104	82	1.53	1.53	2.9	24
2	148	7.48	33.487	26.18	4.59	0.410	0.176	70	1.70	1.70	2.9	30
2	173	7.36	33.773	26.42	4.23	0.378	0.208	64	1.91	1.91	3.0	40
1	197	7.07	33.879	26.55	4.08	0.364	0.225	62	1.94	1.94	7.2	40
1	295	5.76	33.935	26.76	2.73	0.244	0.365	40	2.36	2.36	6.2	62
1	492	4.56	34.068	27.01	1.07	0.096	0.531	15	2.82	2.82	9.6	93
1	737	4.12	34.277	27.22	0.30	0.027	0.606	4	3.17	3.17	24.3	109
1	985	3.38	34.386	27.38	0.37	0.033	0.61	5	2.99	2.99	40.8	119
1	1479	2.56	34.517	27.56	0.77	0.069	0.588	10	2.94	2.94	16.5	156
1	1774	2.16	34.570	27.64	1.28	0.114	0.550	17	3.06	3.06	6.4	173

BROWN BEAR CRUISE 318 STATION 022				BIOLOGICAL DATA
DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL	
0	0.10	0.21	32.503	
5	0.12	0.20	32.507	
19	0.13	0.17	32.508	
48	0.12	0.20	32.507	
100	0.02	0.02	32.771	
5.81		8.99	- WATER COLUMN VALUES	
MESSENGER TIME 2217		INCOMING SOLAR RADIATION - AM 110 PM 92		

DEPTH	BROWN BEAR		CRUISE 318		STATION 022		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.60	0.00	32.500	0.000	25.09	288.2	0.000	0.00	8.15	0.00			
10	9.58	0.00	32.496	0.000	25.09	288.3	0.030	0.02	8.09	0.00			
20	9.57	0.00	32.500	0.000	25.09	288.1	0.059	0.06	7.58	0.00			
30	9.58	0.00	32.500	0.000	25.09	288.4	0.088	0.13	7.14	0.00			
50	9.57	0.00	32.505	0.001	25.10	288.3	0.146	0.37	7.94	0.02	0.95		
75	9.25	0.00	32.510	0.001	25.15	283.4	0.218	0.83	6.74	0.02	0.94		
100	8.69	0.01	32.677	0.003	25.37	263.1	0.287	1.45	6.66	0.01	0.94		
150	7.47	0.00	33.514	0.002	26.21	184.4	0.399	2.85	4.55	0.00	0.89		
200	7.03	0.00	33.885	0.003	26.56	151.5	0.484	4.35	4.04	0.01	1.05		
250	6.34	0.03	33.946	0.025	26.70	138.7	0.557	6.03	3.40	0.06	1.27		
300	5.71	0.00	33.938	0.000	26.77	132.1	0.625	7.96	2.67	0.00	0.99		
400	4.95	0.05	34.002	0.000	26.91	119.3	0.752	12.48	1.70	0.02	0.77		
500	4.54	0.01	34.075	0.001	27.02	110.1	0.868	17.82	1.03	0.00	0.96		
600	4.31	0.06	34.163	0.006	27.11	101.9	0.975	23.85	0.59	0.02	0.68		
700	4.16	0.03	34.247	0.003	27.19	94.8	1.074	30.48	0.34	0.01	0.81		
800	3.94	0.02	34.311	0.002	27.27	88.4	1.167	37.60	0.27	0.02	0.72		
1000	3.35	0.00	34.391	0.000	27.39	77.3	1.335	53.01	0.38	0.00	0.98		
1200	2.96	0.03	34.453	0.003	27.47	69.6	1.483	69.78	0.49	0.01	0.89		
1500	2.53	0.00	34.521	0.000	27.57	61.5	1.683	97.32	0.80	0.00	0.99		

BROWN BEAR CRUISE 318 STATION 023 OBSERVED VALUES														
DATE	4/03/63	HR	10.0	LAT	47-14 N	LONG	126-17 W	SEA	0	DIR	00	WIND	VEL	2 DIR 14
BAROM	29.5	TEMP	DRY	7.9	WET	5.4	RELHU	63	WTRCLR					
CLOUD	TYPE	0	AMT	6	VIS	7	WIRE	ANGLE(S)	2					36
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOJ	SECDI	SNRG	2450	WEA	02	DIR
1	0	9.37	32.474	25.11	6.84	0.511	-0.046							
1	5	9.40	32.471	25.10	7.86	0.702	-0.138							
1	10	9.40	32.464	25.09	6.90	0.616	-0.052							
1	20	9.44	32.470	25.09	6.90	0.616	-0.053							
1	30	9.42	32.470	25.10	7.74	0.691	-0.127							
1	49	9.42	32.468	25.09	7.51	0.671	-0.107							
1	74	9.30	32.496	25.13	7.51	0.671	-0.105							
1	99	8.84	32.606	25.29	7.09	0.633	-0.062							
1	123	7.49	33.091	25.87	5.68	0.507	0.080							
1	147	7.65	33.503	26.17	5.27	0.471	0.113							
1	172	7.50	33.743	26.38	5.02	0.448	0.136							
1	197	7.27	33.348	26.50	2.50	0.223	0.380							
1	294	6.12	33.950	26.73	0.76	0.068	0.519							

BROWN BEAR CRUISE 318 STATION 023 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY (LAB-I DECK-I)	SAL
0	0.28	0.36	32.466
5	0.25	0.43	32.466
19	0.26	0.53	32.474
48	0.26	0.16	32.479
100	0.02	0.01	32.701

12.38 18.56 - WATER COLUMN VALUES

MESSENGER TIME 0223 INCOMING SOLAR RADIATION - AM 79 PM 94
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0038-0048 DEPTMS 100. 70
 0122-0132 30. 0

BROWN BEAR			CRUISE 318		STATION 023		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.37	0.00	32.474	0.000	25.11	286.6	0.000	0.00	6.84	0.00		
10	9.40	0.00	32.464	0.000	25.09	287.9	0.029	0.02	6.90	0.00		
20	9.44	0.00	32.470	0.000	25.09	288.3	0.058	0.06	6.90	0.00		
30	9.42	0.00	32.470	0.000	25.10	288.1	0.087	0.13	7.74	0.00		
50	9.42	0.00	32.468	0.000	25.09	288.6	0.146	0.37	7.51	0.00	0.95	
75	9.29	0.00	32.496	0.002	25.14	285.1	0.218	0.84	7.51	0.00	0.94	
100	8.78	0.02	32.623	0.003	25.32	268.3	0.288	1.46	7.03	0.01	0.94	
150	7.64	0.00	33.540	0.001	26.20	184.8	0.402	2.87	5.30	0.04	0.85	
200	7.24	0.00	33.854	0.001	26.51	156.7	0.488	4.40	2.12	0.04	7.05	
250	6.64	0.02	33.862	0.034	26.59	148.8	0.565	6.18	1.29*		61.34	

BROWN BEAR CRUISE 318 STATION 024 OBSERVED VALUES
 DATE 4/03/63 HR 12.5 LAT 47-14 N LONG 126-03 W WEA 05 WIND VEL 3 DIR 14
 BAROM 29.8 TEMP DRY 7.9 WET 5.7 RELHU 73 WTRCLR SECDI 2012 SWELL 0 DIR
 CLOUD TYPE VIS 4 WIRE ANGLE(S) 0, 0
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AUO SATM
 2 0 9.42 32.463 25.09 6.67 0.596 -0.032 106
 2 5 9.44 32.462 25.09 6.63 0.592 -0.028 105
 2 10 9.44 32.460 25.08 6.81 0.608 -0.045 108
 2 20 9.47 32.478 25.09 6.67 0.596 -0.033 106
 2 30 9.49 32.468 25.08 6.76 0.604 -0.041 107
 2 49 9.46 32.481 25.10 6.67 0.596 -0.032 106
 2 74 9.35 32.486 25.12 6.61 0.590 -0.026 105
 2 99 9.01 32.649 25.30 6.05 0.540 0.028 95
 2 124 7.53 33.184 25.94 5.24 0.468 0.118 80
 2 148 7.59 33.655 26.30 3.98 0.355 0.228 61
 2 173 7.51 33.842 26.46 3.33 0.297 0.286 51
 1 198 7.16 33.887 26.54 3.26 0.291 0.297 49
 1 295 6.01 33.972 26.76 2.22 0.198 0.406 33
 1 493 5.08 34.121 26.99 0.87 0.078 0.540 13
 1 740 4.12 34.275 27.22 0.30 0.027 0.606 4
 1 987 3.48 34.373 27.36 0.31 0.028 0.615 4
 1 1480 2.57 34.529 27.57 0.78 0.070 0.587 11
 1 1776 2.33 34.579 27.53 1.12 0.100 0.561 15

BROWN BEAR CRUISE 318 STATION 024 BIOLOGICAL DATA			
DEPT.	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL
0	0.25	0.90	32.446
5	0.25	0.60	32.446
19	0.35	0.72	32.442
48	0.32	0.56	32.450
100	0.05		32.750
15.22 31.56 - WATER COLUMN VALUES			
MESSENGER TIME 0515		INCOMING SOLAR RADIATION - AM 79 PM 94	

DEPTH	BROWN BEAR		CRUISE 318		STATION 024		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.42	0.00	32.463	0.000	25.09	288.1	0.000	0.00	6.67	0.00	0.95 0.94 0.94 0.89		
10	9.44	0.00	32.460	0.000	25.08	288.9	0.030	0.02	6.81	0.00			
20	9.47	0.00	32.478	0.000	25.09	288.2	0.059	0.06	6.67	0.00			
30	9.49	0.00	32.468	0.000	25.08	289.4	0.088	0.13	6.76	0.00			
50	9.46	0.00	32.480	0.001	25.10	288.4	0.146	0.37	6.67	0.00	1.03 1.22 0.99 0.78		
75	9.35	0.01	32.487	0.001	25.12	286.6	0.218	0.84	6.59	0.00			
100	8.95	0.02	32.667	0.003	25.32	267.6	0.288	1.46	6.02	0.00			
150	7.59	0.00	33.678	0.002	26.32	173.8	0.399	2.83	3.90	0.00			
200	7.13	0.00	33.890	0.000	26.55	152.6	0.482	4.30	3.24	0.00	0.97 0.68 0.80 0.73		
250	6.49	0.01	33.942	0.006	26.68	141.0	0.556	6.00	2.76	0.06			
300	5.97	0.01	33.976	0.000	26.77	132.5	0.625	7.94	2.17	0.00			
400	5.39	0.07	34.054	0.000	26.90	120.6	0.752	12.50	1.39	0.01			
500	5.05	0.00	34.126	0.000	27.00	112.3	0.870	17.92	0.84	0.00	0.98 0.89 1.00		
600	4.63	0.00	34.193	0.001	27.10	103.4	0.979	24.06	0.51	0.03			
700	4.26	0.00	34.253	0.000	27.19	95.5	1.079	30.76	0.33	0.01			
800	3.94	0.01	34.302	0.001	27.26	89.1	1.173	37.94	0.27	0.01			
1000	3.45	0.00	34.378	0.000	27.37	79.4	1.343	53.64	0.32	0.00	0.98 0.89 1.00		
1200	3.02	0.01	34.449	0.002	27.47	70.6	1.495	70.75	0.47	0.02			
1500	2.55	0.00	34.534	0.000	27.58	60.7	1.695	98.29	0.80	0.00			

BROWN BEAR CRUISE 318 STATION 025 OBSERVED VALUES

DATE 4/03/63 HR 15.9 LAT 47-13 N LONG 125-45 W SNRG 1691 WEA 02 WIND VEL 4 DIR 27
 BAROM 29.5 TEMP DRY 9.6 WET 7.2 REL HU 72 WTRCLR SECDI 15 SEA 0 DIR 27 SWELL 0 DIR 27
 CLOUD TYPE 6 AMT 3 VIS WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.36	32.402	25.05	6.82	0.609	-0.044	108	
1	4	9.40	32.402	25.05	6.83	0.610	-0.046	108	
1	9	9.40	32.406	25.05	6.82	0.609	-0.045	108	
1	18	9.43	32.419	25.05	6.80	0.607	-0.043	108	
1	28	9.37	32.430	25.07	6.79	0.606	-0.042	107	
1	45	9.51	32.476	25.09	6.67	0.596	-0.033	106	
1	68	9.30	32.537	25.17	6.54	0.584	-0.019	103	
1	91	8.86	32.905	25.52	5.46	0.488	0.082	86	
1	114	8.12	33.558	26.15	3.86	0.345	0.232	60	
1	137	7.70	33.744	26.35	3.50	0.313	0.269	54	
1	160	7.50	33.901	26.51	2.95	0.263	0.320	45	
1	183	7.23	33.946	26.58	2.75	0.246	0.342	42	
1	274	6.28	34.024	26.77	1.77	0.158	0.442	26	

BROWN BEAR CRUISE 318 STATION 025 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.57	1.09	32.382
5	0.33	0.97	32.388
19	0.35	1.02	32.413
48	0.17	0.19	32.467
100	0.02	0.01	32.915

14.53 36.63 - WATER COLUMN VALUES

MESSANGER TIME 0800 INCOMING SOLAR RADIATION - AM 79 PM 94

DEPTH	BROWN BEAR		CRUISE 318		STATION 025		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.36	0.00	32.402	0.000	25.05	291.8	0.000	0.00	6.82	0.00		
10	9.40	0.00	32.407	0.000	25.05	292.2	0.030	0.02	6.82	0.00	0.93	
20	9.42	0.01	32.421	0.000	25.06	291.6	0.059	0.06	6.80	0.00	0.78	
30	9.39	0.01	32.435	0.001	25.07	290.3	0.089	0.14	6.78	0.00	0.92	
50	9.49	0.01	32.476	0.009	25.09	289.2	0.147	0.38	6.68	0.03	0.80	
75	9.19	0.00	32.618	0.001	25.25	274.6	0.218	0.83	6.29	0.02	0.69	
100	8.57	0.02	33.171	0.030	25.78	224.6	0.281	1.39	4.79	0.07	0.66	
150	7.58	0.01	33.841	0.003	26.45	161.5	0.378	2.59	3.18	0.02	0.65	
200	7.05	0.01	33.972	0.007	26.63	144.5	0.455	3.97	2.55	0.02	5.60	
250	6.52	0.01	33.998	0.009	26.74	134.7	0.526	5.59	2.01	0.03	16.73	

BROWN BEAR CRUISE 318 STATION 026 OBSERVED VALUES												
DATE 4/03/63		HR 18.1	LAT 47-14 N		LONG 125-37 W	SNDG 1646	WEA 03	WIND VEL 10 DIR 13				
BAROM 29.5		TEMP DRY 8.9	WET 6.9		RELHU 76	WTRCLR	SECDI 15	SEA 1 DIR 13	SWELL 1 DIR 27			
CLOUD TYPE 6		AMT 7	VIS 7		WIRE ANGLE(S) 6, 3							
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	9.48	32.397	25.03	6.79	0.606	-0.043		108	0.86		8
2	5	9.50	32.395	25.02	6.77	0.605	-0.041		107	0.82		8
2	10	9.48	32.395	25.03	6.83	0.610	-0.047		108	0.86		8
2	20	9.48	32.401	25.03	6.78	0.606	-0.042		107	0.82		8
2	30	9.46	32.402	25.04	6.84	0.611	-0.047		108	0.87		7
2	49	9.41	32.461	25.09	6.66	0.595	-0.031		105	0.87		7
2	74	9.15	32.575	25.22	6.39	0.571	-0.004		101	1.03		10
2	99	8.21	33.143	25.81	5.03	0.449	0.128		78	1.59		21
2	124	7.82	33.570	26.20	3.97	0.355	0.226		61	1.92		30
2	147	7.71	33.833	26.42	3.18	0.284	0.297		49	1.93	30.7	39
2	172	7.31	33.955	26.57	2.51	0.224	0.362		38	2.28	33.4	47
1	198	7.07	33.986	26.63	2.36	0.211	0.379		36	2.36	35.3	50
1	295	6.22	34.029	26.78	1.74	0.155	0.446		26	2.52	38.6	65
1	492	5.39	34.107	26.94	1.11	0.099	0.514		16	2.81	42.4	81
1	983	3.54	34.377	27.36	0.29	0.026	0.616		4	3.03	46.4	132
1	1476	2.58	34.514	27.56	0.74	0.066	0.591		10	2.93	45.4	145

BROWN BEAR CRUISE 318 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 318	STATION 026	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.42	1.08	6.92		0.96	100		32.394	0.80	2.9	8
					0.76	80					
					0.63	44					
					0.45	22					
					0.25	14					
					0.04	5					
4	0.45	0.65	4.74				50	32.377	0.81	3.0	7
20	0.62	0.73	1.42				10	32.390	0.83	3.2	7
44	0.20	0.16	0.14				1	32.429	0.87	3.9	8
100	0.04	0.01						33.221	1.70	20.7	23
150	0.00							33.819	2.04	26.9	32
200	0.03							33.982	2.31	31.8	43

20.08 25.30 91.26 - WATER COLUMN VALUES

MESSSENGER TIME 1117 INCOMING SOLAR RADIATION - AM 79 PM 94

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

BROWN BEAR				CRUISE 318				STATION 026				INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	UXY ML/L	E(O)	VAR RATIO						
0	9.48	0.00	32.397	0.000	25.03	294.0	0.000	0.00	6.79	0.00							
10	9.48	0.00	32.395	0.000	25.03	294.3	0.030	0.02	6.83	0.00							
20	9.48	0.00	32.401	0.000	25.03	294.0	0.060	0.06	6.78	0.00							
30	9.46	0.00	32.402	0.000	25.04	293.8	0.089	0.14	6.84	0.00							
50	9.41	0.00	32.461	0.003	25.09	289.0	0.148	0.38	6.66	0.01	0.95						
75	9.11	0.01	32.595	0.004	25.24	275.1	0.219	0.83	6.34	0.01	0.94						
100	8.19	0.00	33.163	0.000	25.83	219.7	0.281	1.38	4.98	0.00	0.94						
150	7.67	0.01	33.855	0.001	26.44	161.8	0.378	2.58	3.08	0.01	0.85						
200	7.05	0.00	33.987	0.000	26.64	144.2	0.455	3.95	2.35	0.00	1.03						
250	6.59	0.01	34.016	0.005	26.72	136.7	0.526	5.59	2.02	0.01	1.17						
300	6.19	0.00	34.031	0.000	26.78	131.1	0.593	7.49	1.72	0.00	0.99						
400	5.70	0.05	34.070	0.001	26.88	123.3	0.721	12.09	1.34	0.03	0.75						
500	5.36	0.00	34.111	0.001	26.95	117.1	0.843	17.69	1.09	0.00	1.00						
600	4.93	0.02	34.167	0.007	27.05	108.9	0.957	24.12	0.83	0.01	0.99						
700	4.53	0.02	34.223	0.010	27.13	101.0	1.063	31.19	0.62	0.01	0.93						
800	4.16	0.02	34.278	0.009	27.22	93.4	1.161	38.75	0.46	0.01	0.85						
1000	3.49	0.00	34.386	0.001	27.37	79.3	1.336	54.79	0.28	0.00	1.05						
1200	2.96	0.03	34.472	0.012	27.49	68.3	1.485	71.61	0.32	0.01	1.58						

DATE 4/03/63 HR 21-7 LAT 47-14 N LONG 125-19 W STATION 027 OBSERVED VALUES
 BAROM 29.5 TEMP DRY 8.6 WET 6.6 RFLHU 76 WTRCLR SECDI 1554 WEA 02 WIND VEL 4 DIR 12
 CLOUD TYPE 2 AMT 7 VIS 7 WIRE ANGLE(S) 4 SEA 2 DIR 11 SWELL 1 DIR 11

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.48	31.256	24.14	8.19	0.731	-0.164	129	0.71	2.5	11	
1	5	9.88	32.267	24.86	7.33	0.655	-0.096	117	0.71	2.7	7	
1	9	9.86	32.366	24.94	10.49	0.937	-0.377	167	0.79	2.9	9	
1	18	9.86	32.430	24.99	7.11	0.635	-0.077	114	0.78	3.5	8	
1	27	9.71	32.424	25.01	8.19	0.731	-0.176	132	0.74	2.5	6	
1	45	9.64	32.570	25.14	6.63	0.592	-0.031	106	0.83	4.5	7	
1	68	8.97	33.032	25.60	5.32	0.475	0.092	84	1.29	12.8	14	
1	92	8.44	33.635	26.16	4.18	0.373	0.199	65	1.95	23.8	31	
1	116	8.20	33.760	26.29	3.03	0.270	0.305	46	2.14	30.5	40	
1	138	8.00	33.811	26.36	4.22	0.377	0.200	65	2.25	31.6	41	
1	162	7.88	33.830	26.39	2.77	0.247	0.331	43	2.20	32.4	42	
1	180	7.79	33.844	26.42	2.72	0.243	0.337	42	2.08	25.3	33	
1	278	7.18	33.951	26.59	2.13	0.190	0.398	32	2.28	35.4	51	

BROWN BEAR			CRUISE 318			STATION 027			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.48	0.00	31.256	0.000	24.14	378.6	0.000	0.00	8.19	0.00			
10	9.86	0.00	32.380	0.002	24.95	301.3	0.035	0.02	7.07	0.12	0.97		
20	9.83	0.01	32.429	0.004	25.00	297.3	0.065	0.06	7.09	0.01	0.97		
30	9.70	0.02	32.434	0.000	25.02	295.1	0.095	0.14	6.97	0.05	0.93		
50	9.52	0.02	32.652	0.006	25.22	276.4	0.152	0.37	6.37	0.03	0.79		
75	8.79	0.00	33.226	0.021	25.78	223.4	0.215	0.77	4.98	0.01	0.71		
100	8.34	0.01	33.707	0.015	26.23	181.5	0.266	1.22	3.76	0.03	0.68		
150	7.93	0.00	33.823	0.002	26.38	167.9	0.354	2.34	2.71	0.08	1.04		
200	7.69	0.00	33.860	0.000	26.45	162.4	0.438	3.84	2.67	0.01	32.19		
250	7.39	0.00	33.911	0.001	26.53	155.2	0.518	5.68	2.43	0.03	78.92		

BROWN BEAR CRUISE 318 STATION 028 OBSERVED VALUES
 DATE 5/03/63 HR 00.4 LAT 47-13 N JNG 125-03 W SNG 651 WEA 00 WIND VEL 0 DIR 00
 BAROM 29.1 TEMP DRY 8.9 WET 6.7 RE-HU 74 WTRCLR SECDI 15 SEA 0 DIR 00 SWELL 1 DIR 26
 CLOUD TYPE 5 AMT 9 VIS 7 WIRE ANGLE(S) C

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATM
					MG/L			
1	0	9.46	32.420	25.05	6.69	0.598	-0.034	106
1	5	9.46	32.429	25.06	6.65	0.594	-0.030	105
1	15	9.44	32.412	25.05	6.67	0.596	-0.032	106
1	25	9.46	32.425	25.05	6.60	0.589	-0.026	105
1	44	9.55	32.548	25.13	6.20	0.554	0.008	99
1	69	9.19	32.963	25.52	5.06	0.452	0.113	80
1	94	8.70	33.406	25.94	3.97	0.355	0.215	62
1	118	8.08	33.741	26.30	3.10	0.277	0.300	48
1	143	8.01	33.815	26.36	2.88	0.257	0.320	45
1	167	7.92	33.863	26.41	2.75	0.246	0.332	42
1	193	7.78	33.868	26.44	2.74	0.245	0.335	42
1	291	6.98	33.968	26.63	2.25	0.201	0.390	34
1	389	6.18	34.020	26.78	1.65	0.147	0.455	24
1	486	5.18	34.107	26.97	0.91	0.081	0.535	13
1	584	4.76	34.142	27.08	0.50	0.045	0.578	7

BROWN BEAR CRUISE 318 STATION 028 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.55	1.01		32.413
4	0.50	0.63		32.422
20	0.58	0.92		32.423
44	0.29	0.23		32.438
100	0.03			33.674

21.17 29.43 - WATER COLUMN VALUES

MESSENGER TIME 1553 INCOMING SOLAR RADIATION - AM 79 PM 94
 79 PM 94

BROWN BEAR CRUISE 318 STATION 029 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	SAL
0	0.77			31.740
4	0.83	1.62		31.894
20	0.74	0.25		32.340
44	0.23	0.93		32.435
100	0.05	0.04		33.409

27.33 35.60 - WATER COLUMN VALUES

MESSANGER TIME 1851 INCOMING SOLAR RADIATION - AM 79 PM 94

INTERPOLATED AND COMPUTED VALUES										
DEPTH	BROWN BEAR	CRUISE 318	STATION 029							
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	VAR RATIO
0	9.42	0.00	31.758	0.000	24.54	340.5	0.000	0.00	6.93	0.00
10	9.58	0.00	32.214	0.000	24.87	309.2	0.033	0.02	6.85	0.00
20	9.62	0.00	32.343	0.000	24.96	300.5	0.064	0.06	6.81	0.00
30	9.63	0.00	32.386	0.000	25.00	297.6	0.094	0.14	6.66	0.00
50	9.63	0.00	32.474	0.001	25.07	291.4	0.153	0.38	6.41	0.92
75	9.25	0.01	32.822	0.009	25.40	260.3	0.223	0.82	5.45	0.89
100	8.64	0.00	33.443	0.004	25.98	205.6	0.282	1.34	3.95	0.89

BROWN BEAR CRUISE 318 STATION 030 OBSERVED VALUES
 DATE 5/03/63 HR 06.2 LAT 47-13 N LONG 124-35 W SNOG 73 WEA 00 WIND VEL 10 DIR 02
 BAROM 28.1 TEMP DRY 9.1 WET 6.8 RELHU 72 WTRCLR SECDI SEA 1 DIR 02 SWELL 1 DIR 18
 CLOUD TYPE 5 AMT 4 VIS WIRE ANGLE(S) 5
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN PHOS NITR SIL
 1 0 9.41 28.333 21.87 7.84 0.700 -0.120 121 0.94 8.0 32
 1 5 9.63 29.410 24.54 7.57 0.676 -0.033 106 0.67 4.3 20
 1 10 9.64 31.797 24.79 6.68 0.597 -0.033 106 0.92 4.7 11
 1 20 9.64 32.124 24.79 6.72 0.600 -0.038 107 0.80 3.6 8
 1 30 9.66 32.252 24.89 6.64 0.593 -0.031 106 0.81 3.7 9
 1 49 9.61 32.418 25.02 6.44 0.575 -0.014 102 1.06 6.9 11
 1 59 9.51 32.622 25.20 5.62 0.502 0.060 89 1.26 11.4 16
 1 69 9.16 32.871 25.45 5.26 0.470 0.096 83 1.44 15.0 20

BROWN BEAR CRUISE 318 STATION 030 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL GEOPT POT OXY E(O) VAR
 ANOMALY ANOMALY ENERGY ML/L RATIO
 0 9.41 0.00 28.333 0.000 21.87 595.0 0.000 0.00 7.84 0.00
 10 9.63 0.00 31.797 0.000 24.54 340.9 0.048 0.02 6.68 0.00
 20 9.64 0.00 32.124 0.000 24.79 317.0 0.081 0.07 6.72 0.00
 30 9.66 0.00 32.252 0.000 24.89 308.0 0.112 0.15 6.64 0.00
 50 9.61 0.00 32.436 0.001 25.04 293.9 0.173 0.40 6.36 0.01
 0.83

BROWN BEAR CRUISE 318 STATION 031 OBSERVED VALUES

MOCLIPS RIVER

DATE 5/03/63 HR 08.1 LAT 47-14 N LONG 124-23 W SNGD 37 WEA 02 WIND VEL 5 DIR 09
 BAROM 28.1 TEMP DRY 8.4 WET 6.4 RELHU 75 WTRCLR 4
 CLOUD TYPE 3 AMT 3 VIS 7 WIRE ANGLE(S) 4 SECDI SEA 0 DIR 00 SWELL 1 DIR 27

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.07	26.988	20.88	7.21	0.644	-0.054	109	1.14	9.7	35
1	5	9.40	27.746	21.42	7.03	0.628	-0.045	108	0.98	6.5	27
1	10	9.78	30.384	23.41	6.68	0.597	-0.029	105	0.99	6.9	22
1	20	9.44	32.131	24.83	5.86	0.523	0.042	93	1.08	8.4	13
1	30	9.56	32.467	25.07	5.71	0.510	0.052	91	1.12	6.1	11

BROWN BEAR CRUISE 318 STATION 031 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 171 PM 148

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0031-0041 DEPTHS 30, 0

BROWN BEAR		CRUISE 318		STATION 031		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.07	0.00	26.988	0.000	20.88	690.6	0.000	0.00	7.21	0.00	
10	9.78	0.00	30.384	0.000	23.41	448.1	0.058	0.02	6.68	0.00	
20	9.44	0.00	32.131	0.000	24.83	313.4	0.096	0.08	5.86	0.00	
30	9.56	0.00	32.467	0.000	25.07	290.5	0.127	0.16	5.71	0.00	

BROWN BEAR		CRUISE 318		STATION 032		OBSERVED VALUES									
CAPE SHOALWATER															
DATE	5/03/63	HR	13.0	LAT	46-45 N	LONG	124-12 W	SNDG	38	WEA	00	WIND	VEL		
BAROM	90.9	TEMP	DRY	7.1	WET	4.9	RELHU	72	WTRCLR	SEA	1	DIR	03		
CLOUD	TYPE	VIS	WIRE	ANGLE(S)	0			SECDI	SEA	1	DIR	03	SWELL		
													0 DIR		
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN	PHOS	NITR	SIL				
1	0	9.22	27.130	20.97	6.98	0.623	-0.036	106	1.17	14.3	41				
1	5	9.71	28.653	22.08	6.58	0.588	-0.013	102	1.24	11.4	36				
1	10	9.76	30.976	23.88	6.03	0.539	0.027	95	1.31	9.8	22				
1	20	9.58	32.055	24.75	6.21	0.555	0.009	98	0.90	6.5	10				
1	30	9.68	32.353	24.96	5.77	0.515	0.046	92	0.81	8.7	14				

BROWN BEAR CRUISE 318 STATION 032 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.37	7.61	32.68	27.542
3	1.35			27.980
6	1.32	6.38		30.485
12	0.28	0.98		32.159
28		0.35		32.766

12.90 64.05 - WATER COLUMN VALUES

MESSENGER TIME 0548 INCOMING SOLAR RADIATION - AM 171 PM 148

INTERPOLATED AND COMPUTED VALUES										
BROWN BEAR		CRUISE 318		STATION 032						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	VAR E(O) RATIO
0	9.22	0.00	27.130	0.000	20.97	682.0	0.000	0.00	6.98	0.00
10	9.76	0.00	30.976	0.000	23.88	403.8	0.055	0.02	6.03	0.00
20	9.58	0.00	32.055	0.000	24.75	321.2	0.092	0.08	6.21	0.00
30	9.68	0.00	32.353	0.000	24.96	300.8	0.123	0.16	5.77	0.00

BROWN BEAR CRUISE 318 STATION 033 OBSERVED VALUES
 DATE 5/03/63 HR 17.5 LAT 46-36 N LONG 124-43 W SNDG 768 WEA 00 WIND VEL 10 DIR 04
 BAROM 28.8 TEMP DRY 8.9 WET 6.9 RELHU 76 WTRCLR SECDI 7 SEA 2 DIR 05 SWELL 1 DIR 01
 CLOUD TYPE VIS 0 WIRE ANGLE(S) 3.25
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN PHOS NITR SIL

1	0	9.40	28.918	22.33	6.86	0.613	-0.034	106	1.00	9.2	33
1	5	9.72	30.159	23.25	6.94	0.620	-0.051	109	0.99	6.5	26
1	10	10.00	31.987	24.62	6.51	0.581	-0.023	104	0.93	4.5	14
1	20	10.00	32.216	24.80	6.53	0.583	-0.026	105	0.86	3.9	11
1	30	9.93	32.421	24.97	6.57	0.587	-0.029	105	0.85	5.3	9
1	49	9.65	32.542	25.11	6.37	0.569	-0.008	101	0.88	5.4	8
1	74	9.54	32.885	25.40	5.56	0.497	0.064	89	1.27	13.8	15
1	99	8.78	33.559	26.05	3.59	0.321	0.247	56	1.92	20.5	32
1	124	8.36	33.703	26.22	3.04	0.272	0.301	47	2.18	27.6	37
1	147	8.09	33.818	26.35	3.00	0.268	0.308	47	2.17	30.3	38
1	172	7.75	33.893	26.46	2.82	0.252	0.328	43	2.18	32.2	40
1	197	7.32	33.924	26.55	2.79	0.249	0.337	43	2.20	33.5	44
1	294	6.14	34.003	26.77	1.71	0.153	0.450	25	2.46	30.2	31
1	490	4.88	34.157	27.04	0.60	0.054	0.567	9	2.88	30.1	93
2	725	4.25			0.32	0.029			3.11	46.2	113

BROWN BEAR		CRUISE 318		STATION 033		BIOLOGICAL DATA				
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.04	5.41		2.81	80		29.294	1.02	8.3	28
4	1.11	4.56	11.60	1.43	44	50	29.413	1.03	8.4	29
				0.66	22					
11	1.00	1.51	1.16			10	32.004	0.95	5.5	13
30	1.62	0.43	0.10			1	32.375	0.85	3.9	9
100	0.00	0.00					33.482	1.92	23.9	27
150	0.00						33.749	2.17	29.5	36
200	0.00						33.907	2.27	32.5	41
	36.61	59.63	102.04							

36.61 59.63 103.04 - WATER COLUMN VALUES
 MESSENGER TIME 1200 INCOMING SOLAR RADIATION - AM 171 PM 148
 LIGHT SATURATION INCUBATOR ILLUMINATION 18100

DEPTH	BROWN BEAR		CRUISE 318		STATION 033		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.40	0.00	28.918	0.000	22.33	551.3	0.000	0.00	6.86	0.00			
10	10.00	0.00	31.987	0.000	24.62	332.6	0.045	0.02	6.51	0.00			
20	10.00	0.00	32.216	0.000	24.80	315.8	0.078	0.07	6.53	0.00			
30	9.93	0.00	32.421	0.000	24.97	299.7	0.109	0.15	6.57	0.00			
50	9.65	0.01	32.551	0.001	25.12	286.1	0.168	0.39	6.35	0.00	0.95		
75	9.51	0.01	32.914	0.006	25.43	257.5	0.236	0.82	5.48	0.02	0.94		
100	8.76	0.00	33.570	0.003	26.06	197.9	0.294	1.33	3.55	0.01	0.94		
150	8.05	0.00	33.830	0.000	26.37	169.1	0.386	2.50	2.98	0.01	0.85		
200	7.27	0.00	33.927	0.000	26.56	151.8	0.467	3.94	2.77	0.01	1.05		
250	6.60	0.02	33.971	0.003	26.68	140.2	0.540	5.63	2.27	0.08	1.20		
300	6.09	0.00	34.007	0.001	26.78	131.6	0.609	7.57	1.66	0.00	1.22		
400	5.32	0.03	34.067	0.014	26.92	118.9	0.735	12.08	0.97	0.03	16.66		
500	4.84	0.01							0.57	0.00	1.13		
600	4.55	0.06							0.39	0.04	1.90		
700	4.32	0.03							0.33	0.02	0.93		

BROWN BEAR CRUISE 318 STATION 034 OBSERVED VALUES

DATE 5/03/63 HR 22.4 LAT 46-24 N LONG 124-28 W SNOG 128 WEA 05 WIND VEL 4 DIR 04
 BAROM 27.4 TEMP DRY 9.4 WET 7.1 RELHU 71 WTRCLR SECDI 8 SEA 3 DIR 05 SWELL 0 DIR
 CLOUD TYPE 7 AMT 1 VIS 8 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	PHOS	NITR	SIL
					MGA/L	AOU	SATM		
1	0	9.76	28.786	22.17	7.26	0.648	1.20	6.4	26
1	5	9.49	30.600	23.63	6.69	0.598	0.99	7.9	20
1	10	9.78	31.117	23.98	6.53	0.583	1.07	7.5	17
1	20	9.80	31.808	24.52	6.49	0.580	0.91	6.0	11
1	30	9.82	32.130	24.77	6.45	0.576	0.89	4.8	10
1	49	9.76	32.448	25.02	6.44	0.575	0.88	3.8	8
1	74	9.44	32.859	25.40	5.32	0.475	1.42	10.7	18
1	99	8.48	33.619	26.14	3.35	0.299	2.19	27.3	35
1	124	7.58	33.913	26.50	2.54	0.227	2.36	33.4	44

BROWN BEAR CRUISE 318 STATION 034 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	1.04	3.67	29.474
4	1.22	3.13	30.235
11	1.51	2.34	31.040
30	0.38	0.39	32.177
100	0.05	0.03	33.682
33.30	58.68	-	WATER COLUMN VALUES
MESSENGER TIME 1515 INCOMING SOLAR RADIATION - AM 171 PM 148			

BROWN BEAR			CRUISE 318			STATION 034			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	9.76	0.00	28.786	0.000	22.17	566.4	0.000	0.00	7.26	0.00					
10	9.78	0.00	31.117	0.000	23.98	393.7	0.049	0.02	6.53	0.00					
20	9.80	0.00	31.808	0.000	24.52	342.9	0.086	0.08	6.49	0.00					
30	9.82	0.00	32.130	0.000	24.77	319.5	0.119	0.16	6.45	0.00					
50	9.76	0.00	32.461	0.002	25.03	294.4	0.181	0.41	6.42	0.00	0.95				
75	9.41	0.00	32.891	0.005	25.42	257.6	0.251	0.85	5.24	0.01	0.94				
100	8.44	0.00	33.645	0.004	26.17	187.6	0.307	1.35	3.28	0.01	1.04				

BROWN BEAR CRUISE 318 STATION 035 OBSERVED VALUES

NAHCOTTA

DATE 6/03/63 HR 01.3 LAT 46-29 N LONG 124-12 W SMDG 37 WEA 02 WIND VEL 14 DIR 35
 BAROM 26.8 TEMP DRY 8.3 WET 7.2 RELHU 86 WTRCLR SECDI SEA 2 DIR 35 SWELL 0 DIR
 CLOUD TYPE 7 AMT 1 VIS 7 WIRE ANGLE(S) 9

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MG/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.79	26.725	20.57	7.26	0.648	-0.067	111	1.10	10.4	43	
1	5	9.51	29.831	23.03	7.54	0.673	-0.100	117	0.64	1.9	16	
1	10	9.67	30.811	23.76	7.11	0.635	-0.068	112	0.77	4.9	13	
1	20	9.79	31.782	24.50	6.41	0.573	-0.011	102	0.96	5.1	12	
1	30	9.63	32.183	24.84	5.79	0.517	0.045	92	1.19	9.5	13	

BROWN BEAR CRUISE 318 STATION 035 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LA9-I	SAL
0	2.60	8.52	28.897
4	3.86	10.16	30.075
11	3.27		31.050
27	0.33	0.36	32.144

66.69 168.34 - WATER COLUMN VALUES

MESSANGER TIME 1820 INCOMING SOLAR RADIATION - AM 171 PM 148

DEPTH	TEMP	E(T)	CRUISE 318			STATION 035			INTERPOLATED AND COMPUTED VALUES				
			SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.79	0.00	26.725	0.000	20.57	720.4	0.000	0.00	7.26	0.00			
10	9.67	0.00	30.811	0.000	23.76	414.7	0.058	0.02	7.11	0.00			
20	9.79	0.00	31.782	0.000	24.50	344.7	0.096	0.08	6.41	0.00			
30	9.63	0.00	32.183	0.000	24.84	312.7	0.129	0.16	5.79	0.00			

BROWN BEAR CRUISE 318 STATION 036 OBSERVED VALUES
 DATE 6/03/63 HR 03.6 LAT 46-22 N LONG 124-16 W SMDG 66 WEA WIND VEL 18 DIR 36
 BAROM 26.1 TEMP DRY 9.1 WET 6.4 RELHU 68 WTRCLR SEA DIR 36 SWELL 0 DIR
 CLOUD TYPE 1 VIS WIRE ANGLE(S) --
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L AOU SATN PHOS NITR SIL
 1 0 9.56 23.069 17.76 7.46 0.666 -0.067 111 1.05 4.4 69
 1 5 9.55 29.572 22.82 7.59 0.678 -0.104 118 0.69 4.0 20
 1 10 9.56 30.270 23.36 7.35 0.656 -0.086 115 0.77 2.4 14
 1 20 9.77 31.645 24.40 6.80 0.607 -0.045 108 0.87 4.5 11
 1 30 9.78 32.221 24.84 6.37 0.569 -0.009 102 0.94 3.6 10
 1 49 9.50 32.623 25.20 5.52 0.493 0.069 88 1.34 9.7 17
 1 59 9.17 32.984 25.54 4.59 0.410 0.155 73 1.84 14.6 23

BROWN BEAR CRUISE 318 STATION 036 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL ANOMALY GEOPT ANOMALY POT ENERGY OXY ML/L E(O) VAR RATIO
 0 9.56 0.00 23.069 0.000 17.76 990.4 0.000 0.00 7.46 0.00
 10 9.56 0.00 30.270 0.000 23.36 453.2 0.073 0.02 7.35 0.00
 20 9.77 0.00 31.645 0.000 24.40 354.5 0.114 0.08 6.80 0.00
 30 9.78 0.00 32.221 0.000 24.84 312.2 0.147 0.17 6.37 0.00
 50 9.47 0.00 32.646 0.005 25.22 276.3 0.207 0.41 5.45 0.00
 0.97

BROWN BEAR CRUISE 318 STATION 037 OBSERVED VALUES

NORTH HEAD

DATE 6/03/63 HR 04.7 LAT 46-22 N LONG 124-07 W SMOG 18 MEA 02 WIND VEL 15 DIR 03
 BAROM 25.1 TEMP DRY 8.9 WET 6.4 REL HU 70 WTRCLR 8 SEA 2 DIR 03 SWELL 1 DIR 30
 CLOUD TYPE 0 AMT 2 VIS 7 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
						MGA/L					
1	0	9.20	20.554	15.86	7.42	0.663	-0.049	108	1.18	13.9	88
1	5	9.73	28.568	22.01	6.80	0.607	-0.032	106	1.25	10.6	27
1	10	10.00	30.715	23.64	6.34	0.566	-0.003	101	1.18	8.8	36
1	15	9.88	32.018	24.67	6.10	0.545	0.015	97	1.25	8.4	15

INTERPOLATED AND COMPUTED VALUES										
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT	POT ENERGY	OXY ML/L	VAR RATIO
0	9.20	0.00	20.554	0.000	15.86	1174.7	0.000	0.00	7.42	0.00
10	10.00	0.00	30.715	0.000	23.64	426.9	0.081	0.02	6.34	0.00

BROWN BEAR CRUISE 318 STATION 038 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 6/03/63 HR 05-5 LAT 46-17 N LONG 124-08 W SNGD 18 WEA 02 WIND VEL 15 DIR 03
 BAROM 25.4 TEMP DRY 8.6 WET 6.4 RELHU 73 WTRCLR SECDI SEA 2 DIR 03 SWELL 1 DIR 30
 CLOUD TYPE 0 AMT 2 VIS 7 WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	8.89	17.085	13.20	7.40	0.661	-0.028	104	1.27	14.8	112	
1	4	9.71	28.350	21.84	6.90	0.616	-0.040	107	0.98	8.5	27	
1	9	9.89	31.221	24.05	6.47	0.578	-0.015	103	1.14	8.7	20	
1	14	9.92	31.736	24.44	6.34	0.566	-0.006	101	1.31	12.5	70	

BROWN BEAR CRUISE 318 STATION 038 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
		LAB-I	DECK-I
0	0.77	2.40	17.458
4	1.02	4.04	23.008
11	0.40	1.63	30.988

8.54 45.76 - WATER COLUMN VALUES

MESSANGER TIME 2140 INCOMING SOLAR RADIATION - AM 171 PM 148

BROWN BEAR		CRUISE 318		STATION 038		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	8.89	0.00	17.085	0.000	13.20	1433.1	0.000	0.00	7.40	0.00	1.19
10	9.88	0.02	31.166	0.231	24.01	391.6	0.092	0.02	6.42	0.00	

BROWN BEAR		CRUISE 318		STATION 039		OBSERVED VALUES										
DATE	6/03/63	HR	07.3	LAT	46-10 N	LONG	124-09 W	SNDG	46	WEA	02	WIND	VEL	0	DIR	00
BAROM	24.7	TEMP	DRY	8.2	WET	6.4	RELHU	78	WTRCLR	5	SEA	0	DIR	00	SWELL	0
CLOUD	TYPE	0	AMT	2	VIS	7	WIRE	ANGLE(S)	5							
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN	PHOS	NITR	SIL					
1	0	9.37	24.065	18.56	7.03	0.628	-0.030	105	1.41	9.5	17					
1	5	9.60	26.930	20.76	7.00	0.625	-0.042	107	1.26	10.9	48					
1	10	9.86	29.822	22.96	6.79	0.606	-0.038	107	1.26	10.3	32					
1	20	10.00	31.598	24.32	6.33	0.565	-0.005	101	1.22	8.7	20					
1	30	9.72	32.702	25.23	5.73	0.512	0.047	92	1.66	13.4	21					
1	40	9.42	32.983	25.50	5.00	0.447	0.115	79	1.73	16.5	22					

BROWN BEAR		CRUISE 318		STATION 039		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.37	0.00	24.065	0.000	18.56	913.3	0.000	0.00	7.03	0.00	
10	9.86	0.00	29.822	0.000	22.96	491.0	0.071	0.03	6.79	0.00	
20	10.00	0.00	31.598	0.000	24.32	361.6	0.114	0.09	6.33	0.00	
30	9.72	0.00	32.702	0.000	25.23	275.6	0.146	0.17	5.73	0.00	

BROWN BEAR CRUISE 318 STATION 040 OBSERVED VALUES

CLATSOP SPIT

DATE 6/03/63 HR 08.9 LAT 46-11 N LONG 124-03 W SNDC 17 WEA 00 WIND VEL 12 DIR 11
 BAROM 24.7 TEMP DRY 7.2 WET 5.6 RELHU 81 WTRCLR SECDI SEA 1 DIR 36 SWELL 1 DIR 36
 CLOUD TYPE VIS 8 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.50	24.874	19.17	7.12	0.636	-0.043	107	1.22	10.4	62	
1	5	9.98	30.461	23.44	6.92	0.618	-0.053	109	1.24	7.2	23	
1	10	10.10	31.773	24.44	6.20	0.554	0.004	99	1.26	8.1	18	
1	15	9.96	32.551	25.07	5.92	0.529	0.028	95	1.44	9.8	15	

BROWN BEAR		CRUISE 318		STATION 040		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.50	0.00	24.874	0.000	19.17	854.5	0.000	0.00	7.12	0.00	
10	10.10	0.00	31.773	0.000	24.44	350.0	0.061	0.02	6.20	0.00	

BROWN BEAR CRUISE 318 STATION 041 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 6/03/63 HR 10.5 LAT 46-14 N LONG 124-08 W SMDG 13 WEA 00 WIND VEL 10 DIR 31
 BAROM 24.7 TEMP DRY 7.5 MET 5.7 RELHU 78 WTRCLR SECDI SEA 1 DIR 36 SWELL 1 DIR 30
 CLOUD TYPE AMT 0 VIS 8 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.18	23.066	17.81	7.00	0.625	-0.021	103	1.51	13.8	79	
1	5	9.64	27.477	21.17	6.77	0.605	-0.024	104	1.66	12.9	51	
1	10	9.90	30.965	23.85	6.11	0.546	0.018	97	1.84	11.1	25	
1	15	9.85	32.252	24.86	5.79	0.517	0.042	92	1.46	11.8	20	

BROWN BEAR CRUISE 318 STATION 041 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.67	2.60	22.653
4	1.11	2.59	30.529
11	0.93	2.22	31.156

10.67 44.98 - WATER COLUMN VALUES

MESSANGER TIME 0215 INCOMING SOLAR RADIATION - AM 176 PM 178

BROWN BEAR CRUISE 318 STATION 041		INTERPOLATED AND COMPUTED VALUES									
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.18	0.00	23.066	0.000	17.81	985.6	0.000	0.00	7.00	0.00	
10	9.90	0.00	30.965	0.000	23.85	406.8	0.071	0.02	6.11	0.00	

BROWN BEAR CRUISE 318 STATION 042 OBSERVED VALUES

DATE 6/03/63 HR 12-8 LAT 46-15 N LONG 124-13 W SNDC 41 WEA 00 WIND VEL 10 DIR 12
 BAROM 24.0 TEMP DRY 7.2 WET 5.6 RELHU 79 WTRCLR SECDI SEA 0 DIR SVFLL 1 DIR 34
 CLOUD TYPE VIS 7 WIRE ANGLE(S) 35

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	8.38	14.745	11.43	8.04	0.718	-0.068	110	1.45	16.6	125	
1	4	9.42	24.614	18.98	7.64	0.682	-0.087	115	1.42	13.9	66	
1	8	9.54	29.095	22.45	8.66	0.773	-0.198	134	0.93	5.0	24	
1	16	9.74	31.844	24.56	6.95	0.621	-0.058	110	1.15	8.6	15	
1	24	9.81	32.327	24.92	6.45	0.576	-0.017	103	1.22	10.2	17	
1	29	9.71	32.442	25.03	6.76	0.604	-0.043	108	1.20	7.4	14	

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BROWN BEAR CRUISE 318 STATION 042 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	0.99	1.40	7.72	15.452	
4	1.16	2.40		21.062	
11	2.96	18.95		29.175	
27	0.35	1.87		32.119	

45.16 248.94 - WATER COLUMN VALUES

MESSANGER TIME 0515 INCOMING SOLAR RADIATION - AM 176 PM 178

BROWN BEAR			CRUISE 318			STATION 042			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	8.38	0.00	14.745	0.000	11.43	1605.4	0.000	0.00	8.04	0.00				
10	9.60	0.00	30.277	0.188	23.36	453.3	0.104	0.02	8.41	0.19	0.89			
20	9.80	0.01	32.250	0.079	24.86	310.2	0.143	0.08	6.55	0.00	0.73			

BROWN BEAR										OBSERVED VALUES									
DATE 6/03/63		HR 15.0		LAT 46-15 N		LONG 124-19 W		SNDG 111		WEA 05		WIND VEL 13 DIR 12							
BAROM 23.4		TEMP DRY 7.4		WET 5.8		RELHU 79		WTRCLR		SEA 2		DIR 12							
CLOUD TYPE		VIS 7		WIRE ANGLE(S)		3						SWELL 0 DIR							
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL							
1	0	8.75	19.010	14.71	8.09	0.723	-0.096	115	1.35	17.6	102								
1	5	9.65	29.274	22.57	7.73	0.690	-0.117	120	0.82	5.1	20								
1	10	9.71	30.142	23.24	7.80	0.697	-0.127	122	0.83	6.2	19								
1	20	9.84	31.223	24.06	7.46	0.666	-0.103	118	0.86	5.2	14								
1	30	9.82	32.048	24.70	7.28	0.650	-0.090	116	0.90	5.3	11								
1	50	9.81	32.367	24.95	6.70	0.598	-0.039	107	0.86	5.5	10								
1	74	9.16	33.049	25.59	4.99	0.446	0.119	79	1.70	19.1	28								
1	99	7.92	33.866	26.42	2.78	0.248	0.330	43	2.22	30.7	42								

BROWN BEAR CRUISE 318 STATION 043 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.22	3.78		19.058
4		4.88		21.045
11	2.15	9.76		30.166
27	0.80	1.41		32.005

42.14 157.90 - WATER COLUMN VALUES

MESSENGER TIME 0715 INCOMING SOLAR RADIATION - AM 176 PM 178

DEPTH	BROWN BEAR TEMP	E(T)	CRUISE 318		STATION 043		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
			SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	8.75	0.00	19.010	0.000	14.71	1285.7	0.000	0.00	8.09	0.00		
10	9.71	0.00	30.142	0.000	23.24	465.0	0.089	0.02	7.80	0.00		
20	9.84	0.00	31.223	0.000	24.06	386.9	0.132	0.09	7.46	0.00		
30	9.82	0.00	32.048	0.000	24.70	325.6	0.167	0.18	7.28	0.00		
50	9.81	0.00	32.367	0.000	24.95	302.2	0.231	0.44	6.70	0.00	1.05	
75	9.12	0.00	33.081	0.001	25.62	239.1	0.299	0.86	4.90	0.00		

BROWN BEAR CRUISE 318 STATION 044 OBSERVED VALUES														
DATE	6/03/63	HR	16.9	LAT	46-14 N	LONG	124-26 W	SNDG	273	WEA	05	WIND	VEL	3 DIR 09
BAROM	24.0	TEMP	DRY	8.8	WET	7.5	RELHU	84	WTRCLR	SEA	1	DIR	09	SWELL
CLOUD	TYPE	0	AMT	1	VIS	7	WIRE	ANGLE(S)	4					1 DIR 27
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL		
1	0	8.99	24.038	18.59	8.03	0.717	-0.114	119	119	1.12	13.3	67		
1	5	9.74	29.388	22.64	6.96	0.622	-0.050	109	109	0.98	9.5	30		
1	10	9.58	30.518	23.55	7.26	0.648	-0.079	114	114	0.77	3.9	16		
1	20	9.76	31.380	24.19	6.98	0.623	-0.060	111	111	0.83	5.2	14		
1	30	9.82	31.898	24.58	6.68	0.597	-0.036	106	106	0.83	5.8	12		
1	49	9.84	32.353	24.94	7.05	0.630	-0.071	113	113	0.82	4.3	10		
1	74	9.64	32.546	25.12	6.22	0.556	0.005	99	99	0.97	7.0	10		
1	99	8.28	33.716	26.25	3.12	0.279	0.295	49	49	2.19	28.9	42		
1	124	7.54	33.907	26.50	2.50	0.223	0.360	38	38	2.26	32.4	46		
1	148	7.12	33.951	26.60	2.52	0.225	0.364	38	38	2.43	35.5	51		
1	173	6.97	33.976	26.64	2.27	0.203	0.388	34	34	2.38	35.5	54		
1	198	6.79	33.990	26.67	2.06	0.184	0.409	31	31	2.40	30.7	54		
1	246	6.44	33.995	26.72	1.83	0.163	0.435	27	27	2.70	37.2	60		

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BROWN BEAR CRUISE 318 STATION 044 INTERPOLATED AND COMPUTED VALUES														
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	8.99	0.00	24.038	0.000	18.59	910.2	0.000	0.00	8.03	0.00				
10	9.58	0.00	30.518	0.000	23.55	435.1	0.068	0.02	7.26	0.00				
20	9.76	0.00	31.380	0.000	24.19	374.0	0.109	0.08	6.98	0.00				
30	9.82	0.00	31.898	0.000	24.58	336.7	0.145	0.18	6.68	0.00				
50	9.85	0.01	32.356	0.009	24.94	303.6	0.209	0.44	7.05	0.00	0.95			
75	9.59	0.01	32.593	0.013	25.16	282.5	0.283	0.91	6.09	0.03	0.94			
100	8.24	0.00	33.734	0.005	26.27	178.1	0.341	1.41	3.07	0.01	0.94			
150	7.10	0.00	33.954	0.000	26.60	146.7	0.423	2.44	2.50	0.00	0.89			
200	6.77	0.00	33.991	0.000	26.68	140.3	0.495	3.74	2.05	0.00	1.17			

BROWN BEAR CRUISE 318 STATION 045 OBSERVED VALUES
 DATE 6/03/63 HR 20.4 LAT 46-14 N LONG 124-38 W SNDG 914 WEA 00 WIND VEL 4 DIR 09
 BAROM 23.4 TEMP DRY 9.4 WET 7.9 RELHU 86 WTRCLR SEC DI 3 SEA 1 DIR 09 SWELL 1 DIR 10
 CLOUD TYPE VIS 8 WIRE ANGLE(S) 15
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN - - - - - SATM PHOS NITR SIL
 1 0 9.46 23.124 17.82 8.16 0.729 -0.128 121 1.20 12.8 73
 1 5 10.23 30.091 23.11 6.40 0.572 -0.009 102 1.20 10.8 29
 1 10 10.20 31.470 24.19 6.48 0.579 -0.021 104 1.25 8.3 19
 1 19 10.12 31.939 24.57 6.58 0.588 -0.031 105 1.14 8.9 16
 1 29 10.12 32.075 24.67 6.44 0.575 -0.019 103 1.04 7.6 15
 1 47 10.01 32.397 24.94 6.93 0.619 -0.062 111 1.01 6.7 11
 1 72 9.79 32.551 25.10 7.26 0.648 -0.090 116 0.95 5.6 9
 1 95 9.48 33.012 25.51 5.82 0.520 0.041 93 1.50 15.4 20
 1 120 9.03 33.512 25.97 4.10 0.366 0.199 65 2.00 24.6 31
 1 142 8.56 33.722 26.21 3.20 0.286 0.284 50 2.14 26.0 35
 1 167 8.02 33.852 26.39 2.88 0.257 0.320 45 2.14 24.4 36
 1 191 7.16 33.953 26.59 2.65 0.237 0.352 40 2.23 24.5 43
 1 285 6.02 34.025 26.80 1.83 0.163 0.441 27 2.49 30.6 49
 1 476 5.08 34.115 26.99 0.86 0.077 0.541 12 2.87 36.7 80
 1 572 4.75 34.196 27.09 0.65 0.058 0.565 9 2.88 41.1 95

BROWN BEAR CRUISE 318 STATION 045 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	2.17	7.51	34.34				23.142	1.22	13.9	69
2	2.27	7.62	17.86			50	23.279	1.19	12.4	68
6	0.71	2.20	1.84	2.29	100	10	29.616	1.14	12.1	29
				1.44	78					
				1.94	59					
				1.72	41					
				0.90	21					
				0.18	5					
10	0.48	0.98	0.02			1	31.356	1.15	10.2	19
100	0.10	0.07					33.245	1.55	15.6	19
150	0.02						33.771	1.99	21.1	26
200	0.00						33.954	2.38	32.4	44

12.79 41.12 95.32 - WATER COLUMN VALUES

MESSENGER TIME 1150 INCOMING SOLAR RADIATION - AM 176 PM 178

LIGHT SATURATION INCUBATOR ILLUMINATION 18900

DEPTH	BROWN BEAR TEMP	E(T)	CRUISE 318 STATION 045			INTERPOLATED AND COMPUTED VALUES					VAR RATIO
			SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	
0	9.46	0.00	23.124	0.000	17.82	985.0	0.000	0.00	8.16	0.00	
10	10.20	0.00	31.470	0.000	24.19	374.1	0.069	0.02	6.43	0.00	
20	10.12	0.00	31.961	0.007	24.58	336.6	0.105	0.07	6.57	0.01	0.88
30	10.12	0.00	32.094	0.002	24.69	326.9	0.138	0.16	6.46	0.01	0.97
50	9.99	0.00	32.415	0.012	24.96	301.5	0.201	0.42	7.03	0.03	0.88
75	9.76	0.00	32.602	0.006	25.14	284.4	0.275	0.89	7.12	0.03	0.83
100	9.40	0.00	33.123	0.007	25.61	240.7	0.341	1.48	5.45	0.02	0.78
150	8.41	0.01	33.771	0.003	26.27	178.6	0.447	2.79	3.05	0.02	0.71
200	6.96	0.04	33.971	0.007	26.64	144.3	0.528	4.23	2.56	0.00	1.15
250	6.21	0.12	34.029	0.019	26.72	130.8	0.598	5.83	2.11	0.00	1.11
300	5.91	0.02	34.032	0.002	26.82	127.5	0.663	7.67	1.72	0.00	0.96
400	5.32	0.06	34.078	0.007	26.93	118.0	0.787	12.10	1.15	0.01	0.94
500	5.01	0.01	34.131	0.002	27.01	111.5	0.903	17.44	0.79	0.00	0.87

[illegible]

CST	DEPTH	TEMP	SAL	SIGMA-T	- - - ML/L	- - - MGA/L	- - - OXYGEN AU	- - - SATN	PHOS	NITR	SIL
1	0	9.98	28.682	22.06	7.13	0.637	-0.065	111	0.86	6.1	36
1	5	9.82	31.989	24.66	7.10	0.634	-0.073	113	0.76	2.6	12
1	9	9.84	32.392	24.97	6.98	0.623	-0.065	112	0.77	2.6	8
1	19	9.88	32.472	25.02	6.82	0.609	-0.051	109	0.83	3.2	8
1	28	9.87	32.485	25.03	6.93	0.619	-0.061	111	0.82	3.4	8
1	45	9.75	32.491	25.06	6.77	0.605	-0.045	108	0.90	3.7	7
1	68	9.66	32.608	25.16	6.17	0.551	0.009	98	1.02	6.7	10
1	92	9.21	33.119	25.63	5.03	0.449	0.115	80	1.52	15.5	20
1	115	8.11	33.563	26.15	3.71	0.331	0.245	57	2.06	25.1	33
1	138	7.95	33.795	26.32	3.18	0.284	0.294	49	2.13	25.7	34
1	161	7.74	33.845	26.43	3.16	0.282	0.298	49	2.17	30.0	40
1	276	6.25	33.952	26.71	2.53	0.226	0.375	38	2.35	33.0	60
1	443	5.16	34.095	26.96	0.92	0.032	0.535	13	2.80	40.2	83
1	699	4.35	34.195	27.13							

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BROWN BEAR CRUISE 318 STATION 046 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.51	4.92		28.800
4	1.51	3.99		30.749
11	0.99	0.88		32.429
30	0.74	0.59		32.496
100	0.38	0.32		33.411

31.24 48.48 - WATER COLUMN VALUES

MESSSENGER TIME 1625 INCOMING SOLAR RADIATION - AM 176 PM 178

DEPTH	BROWN BEAR		CRUISE 318		STATION 046		INTERPOLATED AND COMPUTED VALUES				
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL. ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.98	0.00	28.682	0.000	22.06	577.4	0.000	0.00	7.13	0.00	
10	9.85	0.00	32.431	0.019	25.00	297.2	0.045	0.02	6.95	0.00	1.00
20	9.88	0.00	32.475	0.001	25.02	294.8	0.074	0.06	6.83	0.01	0.85
30	9.86	0.00	32.485	0.002	25.04	293.9	0.104	0.14	6.93	0.00	0.94
50	9.74	0.01	32.496	0.007	25.06	291.6	0.163	0.38	6.68	0.00	0.80
75	9.58	0.01	32.739	0.015	25.28	271.6	0.234	0.83	5.88	0.01	0.71
100	8.81	0.06	33.291	0.008	25.83	219.3	0.296	1.38	4.54	0.04	0.67
150	7.85	0.00	33.804	0.002	26.38	168.1	0.393	2.60	3.14	0.02	0.58
200	7.24	0.05	33.918	0.024	26.56	152.0	0.474	4.04	3.02	0.02	1.71
250	6.59	0.04	33.957	0.019	26.67	141.2	0.548	5.74	2.73	0.01	1.11
300	6.04	0.02	33.975	0.001	26.76	133.4	0.617	7.69	2.32	0.02	2.28
400	5.36	0.03	34.062	0.001	26.91	119.7	0.745	12.25	1.34	0.05	6.57
500	4.96	0.05	34.134	0.003	27.02	110.7	0.861	17.60			1.82
600	4.68	0.09	34.181	0.005	27.08	104.8	0.970	23.74			2.30

BROWN BEAR CRUISE 318 STATION 047 OBSERVED VALUES

DATE 7/03/63 HR 02.9 LAT 46-14 N LONG 125-10 W SNOG 1650 WEA 00 WIND VEL 18 DIR 36
 BAROM 21.3 TEMP DRY 9.2 WET 7.5 RELHU 79 WTRCLR SECDI SEA 3 DIR 36 SWELL 0 DIR
 CLOUD TYPE AMT 0 VIS 6 WIRE ANGLE(S) ---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OX:GEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.08	32.514	25.02	7.45	0.665	-0.110	120	0.78	4.1	10	
1	5	10.12	32.514	25.01	7.22	0.645	-0.090	116	0.80	3.7	10	
1	10	10.09	32.512	25.02	7.66	0.684	-0.129	123	0.80	3.4	10	
1	20	9.92	32.508	25.04	7.23	0.646	-0.088	116	0.80	3.4	9	
1	30	9.91	32.445	25.00	7.09	0.633	-0.075	114	0.79	3.6	9	
1	49	9.91	32.594	25.11	7.12	0.636	-0.079	114	0.94	6.4	9	
1	74	9.32	33.052	25.56	5.76	0.514	0.048	91	1.03	16.2	19	
1	99	8.80	33.608	26.08	3.81	0.340	0.227	60	1.92	24.5	31	
1	124	8.43	33.775	26.27	3.26	0.291	0.280	51	2.14	29.8	37	
1	148	7.56	33.859	26.45	3.05	0.272	0.309	47	2.14	30.6	40	

BROWN BEAR CRUISE 318 STATION 047 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.08	0.00	32.514	0.000	25.02	294.6	0.000	0.00	7.45	0.00	
10	10.09	0.00	32.512	0.000	25.02	295.1	0.030	0.02	7.66	0.00	
20	9.92	0.00	32.508	0.000	25.04	292.9	0.060	0.06	7.23	0.00	
30	9.91	0.00	32.445	0.000	25.00	297.6	0.090	0.14	7.09	0.00	
50	9.89	0.00	32.609	0.001	25.13	285.6	0.148	0.38	7.09	0.01	0.95
75	9.30	0.00	33.077	0.003	25.59	242.1	0.215	0.80	5.67	0.01	0.94
100	8.79	0.00	33.619	0.002	26.09	194.7	0.270	1.28	3.77	0.01	0.94

BROWN BEAR CRUISE 318 STATION 048 OBSERVED VALUES									
DATE 7/03/63	HR 04.6	LAT 46-14 N	LONG 125-23 W	SEA 00	WIND VEL 15 DIR 36				
BAROM 20.7	TEMP DRY 8.9	WET 7.5	KELHU 83	WTRCLR	SEA 2 DIR 30	SWELL 2 DIR 04			
CLOUD TYPE	AMT 0	VIS 8	WIRE ANGLE(S) 8						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.54	32.420	5.04	7.46	0.666	-0.104		118
1	5	9.55	32.409	5.03	7.42	0.663	-0.100		118
1	10	9.55	32.404	5.02	7.06	0.631	-0.068		112
1	20	9.55	32.411	5.03	7.44	0.664	-0.102		118
1	30	9.51	32.420	5.04	7.70	0.688	-0.122		122
1	49	9.50	32.425	5.05	7.06	0.631	-0.068		112
1	73	9.20	32.567	5.21	6.90	0.616	-0.051		109
1	98	8.07	33.207	5.88	5.15*	0.460	0.119		79
1	123	7.83	33.541	6.18	5.67*	0.506	0.074		87
1	147	7.66	33.771	6.38	3.45	0.308	0.274		53
1	171	7.43	33.883	6.50	3.42	0.305	0.279		52
1	196	7.20	33.941	6.58	2.84	0.254	0.334		43
1	293	6.16	33.986	6.75	2.16	0.193	0.410		32

BROWN BEAR CRUISE 318 STATION 048 BIOLOGICAL DATA									
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL					
0	0.34	0.49		32.402					
4	0.45	0.42		32.413					
10	0.49	0.39		32.415					
30	0.45	0.52		32.405					
100	0.03	0.02		33.282					
13.84				- WATER COLUMN VALUES					
MESSENGER TIME 2100				INCOMING SOLAR RADIATION - AM 176 PM 178					

DEPTH	BROWN BEAR		CRUISE 318		STATION 048		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.54	0.00	32.420	0.000	25.04	293.2	0.000	0.00	7.46	0.00		
10	9.55	0.00	32.404	0.000	25.02	294.7	0.030	0.02	7.06	0.00		
20	9.55	0.00	32.411	0.000	25.03	294.4	0.060	0.06	7.44	0.00		
30	9.51	0.00	32.420	0.000	25.04	293.2	0.089	0.14	7.70	0.00		
50	9.50	0.00	32.425	0.002	25.05	293.1	0.148	0.38	7.05	0.01	0.96	
75	9.11	0.02	32.614	0.010	25.26	273.5	0.220	0.83	6.80	0.04	1.01	
100	8.03	0.01	33.242	0.002	25.91	211.7	0.281	1.37	5.61	0.37	1.37	
150	7.63	0.00	33.790	0.001	26.40	166.1	0.376	2.57	3.45	0.02	0.84	
200	7.16	0.00	33.946	0.001	26.59	148.8	0.455	3.98	2.72	0.01	8.27	
250	6.65	0.00	33.960	0.004	26.67	142.0	0.529	5.67	2.26	0.07	8.27	

BROWN BEAR CRUISE 318 STATION 049 OBSERVED VALUES

DATE 7/03/63 HR 07.6 LAT 46-13 N LONG 125-38 W SNOG 2147 WEA 02 WIND VEL 12 DIR 02
 BAROM 21.7 TEMP DRY 9.0 WET 7.6 RELHU 83 WTRCLR SECDI SEA 2 DIR 02 SWELL DIR 36
 CLOUD TYPE 4 AMT 1 VIS 7 WIRE ANGLE(S) 21.20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	9.51	32.411	25.03	7.79	0.696	-0.133	124	0.78	2.9	8
2	5	9.52	32.408	25.03	7.91	0.706	-0.144	126	0.78	2.9	8
2	10	9.48	32.409	25.04	6.89	0.615	-0.052	109	0.77	2.7	8
2	20	9.50	32.413	25.04	7.08	0.632	-0.069	112	0.76	2.6	8
2	30	9.48	32.413	25.04	7.06	0.631	-0.067	112	0.82	2.6	8
2	49	9.54	32.527	25.12	6.84	0.611	-0.049	109	0.87	5.0	8
2	74	9.09	32.630	25.27	6.16	0.550	0.017	97	1.12	8.7	12
2	99	8.21	33.295	25.93	4.64	0.414	0.162	72	1.74	20.9	26
2	124	7.92	33.634	26.23	3.57	0.319	0.260	55	1.92	27.4	34
2	148	7.69	33.785	26.39	3.66	0.327	0.255	56	2.11	29.8	39
2	173	7.41	33.902	26.52	3.14	0.280	0.305	48	1.97	26.9	37
1	182	7.33	33.916	26.54	3.02	0.270	0.316	46	2.12	32.4	44
1	273	6.37	33.996	26.73	2.42	0.216	0.383	36	2.56	37.9	66
1	456	5.18	34.093	26.96	0.85	0.076	0.541	12	2.87	42.4	91
1	689	4.38	34.239	27.16	0.44	0.039	0.589	6	3.02	44.3	113
1	920	3.70	34.368	27.34	0.29	0.026	0.613	4	3.02	44.6	130
1	1388	2.71	34.498	27.53	0.64	0.057	0.598	9	3.01	44.6	148
1	1668	2.23	34.556	27.62	1.09	0.097	0.565	15	2.84	41.6	152

BROWN BEAR CRUISE 318 STATION 049 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 186 PM 186

ZOCPLANKTON (CLARKE-BUMPUS) HORIZ -- TIME 0111-0121 DEPTHS 100, 70
 0145-0155 35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 049		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0 10 20 30	9.51	0.00	32.411	0.000	25.03	293.4	0.000	0.00	7.79	0.00			
	9.48	0.00	32.409	0.000	25.04	293.2	0.030	0.02	6.89	0.00			
	9.50	0.00	32.413	0.000	25.04	293.4	0.060	0.06	7.08	0.00			
	9.48	0.00	32.413	0.000	25.04	293.3	0.089	0.14	7.06	0.00			
50 75 100 150	9.53	0.00	32.526	0.004	25.12	286.1	0.148	0.38	6.83	0.00	0.95 0.94 0.94 0.93		
	9.05	0.01	32.654	0.006	25.30	269.7	0.218	0.82	6.10	0.01			
	8.19	0.00	33.313	0.001	25.94	208.6	0.278	1.35	4.58	0.00			
	7.67	0.00	33.795	0.001	26.40	166.3	0.372	2.54	3.63	0.01			
200 250 300 400	7.12	0.00	33.960	0.018	26.61	147.2	0.451	3.95	2.82	0.06	1.42 0.94 0.94 0.74		
	6.59	0.00	34.003	0.017	26.71	137.8	0.523	5.60	2.49	0.06			
	6.15	0.01	34.013	0.002	26.78	132.0	0.591	7.52	2.17	0.03			
	5.47	0.02	34.067	0.004	26.90	120.6	0.718	12.07	1.30	0.06			
500 600 700 800	4.99	0.02	34.120	0.001	27.00	112.1	0.836	17.49	0.69	0.04	0.81 0.68 0.94 0.60		
	4.63	0.03	34.183	0.002	27.09	104.2	0.945	23.64	0.48	0.06			
	4.34	0.00	34.246	0.000	27.17	97.1	1.047	30.42	0.43	0.00			
	4.04	0.00	34.305	0.001	27.25	90.0	1.141	37.70	0.34	0.00			
1000 1200 1500	3.50	0.01	34.398	0.003	27.38	78.6	1.312	53.38	0.30	0.01	0.93 0.88 0.85		
	3.06	0.01	34.459	0.005	27.47	70.4	1.463	70.39	0.42	0.01			
	2.52	0.00	34.520	0.002	27.57	61.4	1.663	98.05	0.81	0.01			

BROWN BEAR CRUISE 318 STATION 050 OBSERVED VALUES

DATE 7/03/63 HR 12.2 LAT 46-14 N LONG 125-52 W WEA 00 WIND VEL 15 DIR 02
 BAROM 21.3 TEMP DRY 8.9 WET 7.8 RELHU 86 WTRCLR SECDI SNRG 2560 SEA 3 DIR 35 SWELL 0 DIR 36
 CLOUD TYPE VIS 7 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.39	32.428	25.07	6.82	0.609	-0.045	108	
1	5	9.42	32.430	25.06	6.81	0.608	-0.044	108	
1	10	9.42	32.421	25.06	6.78	0.606	-0.041	107	
1	20	9.43	32.423	25.06	6.75	0.603	-0.039	107	
1	30	9.42	32.426	25.06	6.78	0.606	-0.041	107	
1	49	9.42	32.437	25.07	6.69	0.598	-0.033	106	
1	74	9.33	32.483	25.12	6.56	0.586	-0.021	104	
1	99	9.09	32.602	25.25	6.12	0.547	0.021	96	
1	124	8.18	33.680	26.23	4.35	0.389	0.187	68	
1	148	7.80	33.851	26.44	2.86	0.255	0.326	44	
1	173	7.70	33.901	26.53	2.78	0.248	0.338	42	
1	198	7.34	33.982	26.72	2.05	0.183	0.416	31	

BROWN BEAR CRUISE 318 STATION 050 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.54	0.65		32.412
4	0.34	0.78		32.429
11	0.62	0.57		32.424
30	0.56	0.74		32.417
100	0.06	0.00		32.630
16.36	20.12	-	WATER COLUMN VALUES	

MESSANGER TIME 0335 INCOMING SOLAR RADIATION - AM 186 PM 186

DEPTH	BROWN BEAR		CRUISE 318		STATION 050		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.39	0.00	32.428	0.000	25.07	290.3	0.000	0.00	6.82	0.00			
10	9.42	0.00	32.421	0.000	25.06	291.4	0.030	0.02	6.78	0.00			
20	9.43	0.00	32.423	0.000	25.06	291.6	0.059	0.06	6.75	0.00			
30	9.42	0.00	32.426	0.000	25.06	291.4	0.089	0.14	6.78	0.00			
50	9.42	0.00	32.438	0.000	25.07	290.9	0.147	0.38	6.69	0.00	0.95		
75	9.33	0.00	32.478	0.006	25.12	286.9	0.220	0.84	6.56	0.01	0.94		
100	9.05	0.01	32.642	0.010	25.29	271.0	0.290	1.47	6.06	0.01	0.95		
150	7.79	0.01	33.937	0.103	26.49	157.4	0.398	2.79	3.29	0.04	0.93		
200	7.30	0.00	33.904	0.000	26.54	153.9	0.477	4.19	2.55	0.15	6.32		
250	6.44	0.10	33.955	0.004	26.69	139.3	0.551	5.89	2.17	0.20	63.09		

BROWN BEAR CRUISE 318 STATION 50A BIOLOGICAL DATA

DATE 7/03/63 LAT 46-14 N LONG 125-60 W

DEPTH CHL-A PRODUCTIVITY
LAB-I DECK-I

0 0.63 4.78

MESSANGER TIME 0553 INCOMING SOLAR RADIATION - AM 186 PM 186

BROWN BEAR CRUISE 318 STATION 051 OBSERVED VALUES												
DATE	7/03/63	HR	15.0	LAT	46-13 N	LONG	126-07 W	SNDG	2560	WEA	05	WIND
BAROM	21.3	TEMP	DRY	9.3	WET	7.3	RELHU	76	WTRCLR	SEA	3	DIR
CLOUD	0	VIS	0	WIRE	ANGLE(S)	28.11						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	PHOS	NITR	SIL	
2	0	9.72	32.536	25.10	7.05	0.630	-0.070	112	0.79	3.7	6	
2	5	9.75	32.529	25.09	7.07	0.631	-0.072	113	0.81	3.7	4	
2	10	9.76	32.524	25.08	8.18	0.731	-0.071	131	0.83	3.9	4	
2	20	9.75	32.526	25.09	6.82	0.609	-0.050	109	0.79	3.5	4	
2	30	9.78	32.523	25.08	6.60	0.589	-0.030	105	0.81	3.1	4	
2	48	9.76	32.535	25.09	7.12	0.636	-0.077	114	0.78	3.8	5	
2	72	9.60	32.562	25.14	6.61	0.590	-0.029	105	0.90	4.8	6	
2	97	8.41	33.263	25.87	4.86	0.434	0.140	76	0.88	20.2	25	
2	121	8.06	33.605	26.19	4.18	0.373	0.204	65	1.85	27.5	31	
2	145	7.83	33.816	26.39	3.30	0.295	0.285	51	2.00	30.0	36	
2	169	7.56	33.909	26.50	3.81	0.340	0.243	58	2.19	32.8	42	
1	182	7.40	33.879	26.50	3.05	0.272	0.313	47	2.09	31.7	41	
1	273	6.42	33.970	26.71	2.28	0.204	0.395	34	2.53	35.5	57	
1	457	5.20	34.080	26.95	1.01	0.090	0.526	15	2.80	40.9	83	
1	690	4.40	34.242	27.16	0.33	0.029	0.599	5	2.80	37.1	95	
1	922	3.74	34.371	27.33	0.25	0.022	0.616	3	3.02	44.5	124	
1	1394	2.74	34.520	27.55	0.93	0.083	0.579	13	2.91	44.8	148	
1	1675	2.27	34.559	27.62					2.80	44.0	159	

BROWN BEAR CRUISE 318 STATION 051 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.24	0.59	32.523
4	0.25	0.44	32.528
11	0.27	0.44	32.524
30	0.23	0.51	32.572
100	0.04	0.05	33.335

7.48 14.16 - WATER COLUMN VALUES

MESSENGER TIME 0745 INCOMING SOLAR RADIATION - AM 186 PM 186

DEPTH	BROWN BEAR		CRUISE 318		STATION 051		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.72	0.00	32.536	0.000	25.10	287.3	0.000	0.00	7.05	0.00		
10	9.76	0.00	32.524	0.000	25.08	289.0	0.030	0.02	8.18	0.00		
20	9.75	0.00	32.526	0.000	25.09	288.9	0.059	0.06	6.82	0.00		
30	9.78	0.00	32.523	0.000	25.08	289.8	0.083	0.14	6.60	0.00		
50	9.77	0.01	32.525	0.008	25.08	289.8	0.146	0.38	7.13	0.00	0.91	
75	9.46	0.03	32.637	0.018	25.22	277.2	0.218	0.83	6.40	0.04	0.85	
100	8.34	0.01	33.318	0.004	25.92	210.4	0.279	1.37	4.75	0.02	0.84	
150	7.78	0.00	33.848	0.002	26.42	163.8	0.373	2.55	3.45	0.11	0.79	
200	7.19	0.00	33.877	0.015	26.53	154.3	0.453	3.99	2.58	0.21	2.04	
250	6.64	0.00	33.923	0.017	26.64	144.3	0.529	5.72	2.09	0.25	1.62	
300	6.19	0.01	33.989	0.002	26.75	134.3	0.599	7.70	2.06	0.01	0.94	
400	5.50	0.02	34.050	0.004	26.89	122.2	0.728	12.32	1.35	0.01	0.75	
500	5.02	0.02	34.110	0.001	26.99	113.1	0.847	17.80	0.82	0.01	0.81	
600	4.65	0.03	34.180	0.002	27.09	104.6	0.957	23.99	0.50	0.02	0.68	
700	4.37	0.00	34.248	0.000	27.17	97.2	1.059	30.79	0.32	0.00	0.95	
800	4.07	0.00	34.307	0.000	27.25	90.2	1.154	38.08	0.25	0.02	0.60	
1000	3.55	0.00	34.404	0.001	27.38	78.6	1.325	53.78	0.31	0.04	2.26	
1200	3.11	0.01	34.474	0.002	27.48	69.8	1.475	70.71	0.57	0.16	8.58	
1500	2.56	0.00	34.538	0.001	27.58	60.5	1.673	98.06	0.93	0.19	7.92	

BROWN BEAR CRUISE 318 STATION 052 OBSERVED VALUES

DATE 7/03/63 HR 18.1 LAT 46-13 N LONG 126-21 W SNDG 2651 MEA 03 WIND VEL 15 DIR 12
 BAROM 22.0 TEMP DRY 9.6 WET 8.2 RELHU 83 WTRCLR SEA 3 DIR 12 SWELL 2 DIR 27
 CLOUD TYPE 3 AMT 6 VIS 7 WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
1	0	9.95	32.570	25.09	8.65	0.773	-0.216	139
1	5	10.01	32.573	25.08	7.63	0.681	-0.125	123
1	10	9.99	32.575	25.08	8.75	0.781	-0.225	140
1	19	10.02	32.573	25.08	7.96	0.711	-0.155	128
1	29	10.00	32.568	25.08	7.68	0.686	-0.130	123
1	47	9.97	32.575	25.09	8.73	0.780	-0.223	140
1	69	9.94	32.581	25.10	9.22	0.823	-0.267	148
1	93	8.68	33.396	25.93	4.20	0.375	0.195	66
1	116	8.61	33.686	26.17	3.49	0.312	0.258	55
1	139	8.25	33.855	26.36	3.44	0.307	0.266	54
1	162	7.94	33.931	26.46	2.53	0.226	0.352	39
1	186	7.58	33.962	26.54	2.48	0.221	0.361	38
1	277	6.39	33.981	26.72	2.84	0.254	0.345	42

BROWN BEAR CRUISE 318 STATION 052 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	LIGHT SAT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.45		4.44			50	32.568	0.78	3.9	7
8	0.40	0.52	3.42			10	32.558	0.82	3.9	8
26	0.44	0.54	0.04			1	32.562	0.83	4.0	8
45	0.50	0.61	0.08	0.77	100		32.565	1.11	2.9	6

100	0.04	0.00		0.10	5		33.294	1.80	21.2	25
150	0.00						33.837	2.03	22.4	26
200	0.00						33.922	2.27	32.9	40

19.91 24.62 63.98 - WATER COLUMN VALUES

MESSENGER TIME 1145 INCOMING SOLAR RADIATION - AM 186 PM 186

LIGHT SATURATION INCUBATOR ILLUMINATION 18600

BROWN BEAR CRUISE 318 STATION 052 INTERPOLATED AND COMPUTED VALUES											
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.95	0.00	32.570	0.000	25.09	288.4	0.000	0.00	8.65	0.00	
10	9.99	0.00	32.575	0.000	25.08	288.9	0.030	0.02	8.75	0.00	
20	10.02	0.00	32.572	0.000	25.08	289.7	0.059	0.06	7.90	0.00	0.88
30	10.00	0.00	32.568	0.000	25.08	289.9	0.088	0.14	7.72	0.02	0.96
50	10.00	0.02	32.555	0.014	25.07	291.2	0.146	0.38	8.97	0.08	0.85
75	9.63	0.08	32.770	0.043	25.30	270.0	0.217	0.83	8.03	0.32	0.74
100	8.62	0.05	33.516	0.013	26.04	199.7	0.276	1.35	3.74	0.12	0.69
150	8.10	0.00	33.900	0.002	26.42	164.6	0.368	2.50	3.01	0.07	0.64
200	7.36	0.00	33.965	0.003	26.57	150.2	0.447	3.92	2.70	0.07	20.06
250	6.66	0.02	33.955	0.012	26.66	142.2	0.521	5.62	2.34	0.20	49.83

BROWN BEAR CRUISE 318 STATION 053 OBSERVED VALUES									
DATE 7/03/63	HR 22-1	LAT 46-14 N	LONG 126-35 W	SEA 4	DIR 02	WIND VEL 18	DIR 02	SWELL 4	DIR 02
BAROM 22.0	TEMP DRY 9.4	WET 8.2	RELHU 83	WTRCLR	SECDI	SDG 2650	WEA 01		
CLOUD TYPE 8	AMT 3	VIS 7	WIRE ANGLE(5) 20	---					
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN	
					MGA/L				
2	0	9.91	32.536	25.07	6.64	0.593	-0.036	106	
2	5	9.93	32.537	25.06	6.63	0.592	-0.035	106	
2	10	9.87	32.536	25.07	6.63	0.592	-0.034	106	
2	20	9.87	32.535	25.07	6.61	0.590	-0.032	106	
2	30	9.88	32.537	25.07	6.61	0.590	-0.033	106	
2	45	9.83	32.534	25.02	6.60	0.589	-0.031	106	
2	74	9.43	32.734	25.30	6.01	0.537	0.026	95	
2	99	8.31	33.433	26.02	4.00	0.357	0.217	62	
2	124	8.08	33.706	26.27	3.20	0.286	0.291	50	
2	148	7.88	33.839	26.40	2.80	0.250	0.329	43	
2	174	7.57	33.916	26.51	2.48	0.221	0.361	38	
1	194	7.41	33.928	26.54	2.61	0.233	0.352	40	
1	290	6.70	33.994	26.69	2.18	0.195	0.400	33	
1	484	5.32	34.085	26.93	1.00	0.089	0.525	15	
1	725	4.44	34.245	27.16	0.34	0.030	0.597	5	
1	972	3.68	34.392	27.36	0.32	0.029	0.611	4	
1	1462	2.71	34.517	27.55	0.68	0.061	0.594	9	
1	1753	2.20	34.562	27.63	1.05	0.094	0.569	14	

DEPTH	BROWN BEAR		CRUISE 318		STATION 053		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.91	0.00	32.536	0.000	25.07	290.3	0.000	0.00	6.64	0.00	0.95 0.94 0.94 0.90 1.45 1.45 0.98 0.76 0.92 0.67 0.86 0.69 0.97 0.89 0.98		
10	9.87	0.00	32.536	0.000	25.07	289.9	0.030	0.02	6.63	0.00			
20	9.87	0.00	32.535	0.000	25.07	290.1	0.059	0.06	6.61	0.00			
30	9.88	0.00	32.537	0.000	25.07	290.3	0.088	0.14	6.61	0.00			
50	9.82	0.00	32.535	0.002	25.08	290.0	0.147	0.38	6.60	0.00			
75	9.38	0.01	32.761	0.006	25.33	266.8	0.217	0.82	5.93	0.02			
100	8.29	0.01	33.449	0.002	26.04	200.0	0.276	1.34	3.95	0.02			
150	7.86	0.00	33.847	0.000	26.41	165.0	0.368	2.50	2.76	0.02			
200	7.36	0.00	35.932	0.000	26.55	152.6	0.448	3.93	2.61	0.02			
250	6.99	0.00	33.966	0.001	26.63	145.7	0.523	5.66	2.47	0.07			
300	6.62	0.00	33.999	0.001	26.70	139.1	0.595	7.69	2.12	0.01			
400	5.88	0.02	34.047	0.004	26.84	127.2	0.729	12.49	1.50	0.04			
500	5.25	0.01	34.095	0.001	26.95	117.0	0.852	18.17	0.93	0.00			
600	4.83	0.03	34.160	0.003	27.05	108.2	0.966	24.58	0.59	0.01			
700	4.51	0.01	34.228	0.001	27.14	100.3	1.071	31.60	0.37	0.00			
800	4.19	0.00	34.294	0.001	27.23	92.7	1.169	39.11	0.29	0.02			
1000	3.61	0.01	34.403	0.001	27.37	79.5	1.343	55.10	0.33	0.00			
1200	3.18	0.02	34.468	0.007	27.47	71.0	1.495	72.28	0.43	0.01			
1500	2.65	0.00	34.522	0.001	27.56	62.7	1.699	100.38	0.72	0.00			

DATE 8/03/63 HR 01.1 LAT 46-14 N LONG 126-49 W
BAROM 22.0 TEMP DRY 9.6 WET 8.2 RELHU 83 WTRCLR
CLOUD TYPE AMT 0 VIS 8 WIRE ANGLE(S) 17

BROWN BEAR CRUISE 318 STATION 054

OBSERVED VALUES

SDNG 2651 WEA 02 WIND VEL 20 DIR 35
SECDI 19 SEA 3 DIR 01 SWELL 0 DIR

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	— — —	MGA/L	OXYGEN	— — —	SATN
1	0	9.87	32.537	25.07	6.79	0.606	0.606	0.049	109	109
1	5	9.91	32.540	25.07	6.69	0.598	0.598	0.040	107	107
1	10	9.89	32.533	25.07	6.66	0.595	0.595	0.037	107	107
1	20	9.86	32.531	25.07	6.65	0.594	0.594	0.036	106	106
1	29	9.87	32.529	25.07	6.67	0.596	0.596	0.038	107	107
1	47	9.84	32.528	25.07	6.61	0.590	0.590	0.032	106	106
1	71	9.59	32.938	25.74	6.29	0.562	0.562	0.025	96	96
1	95	8.47	33.315	25.90	4.29	0.384	0.384	0.189	67	67
1	117	8.11	33.654	26.22	3.44	0.307	0.307	0.269	53	53
1	140	7.88	33.809	26.38	2.95	0.263	0.263	0.315	46	46
1	165	7.64	33.882	26.47	2.80	0.250	0.250	0.332	43	43
1	188	7.42	33.933	26.54	2.51	0.224	0.224	0.361	38	38
1	282	6.56	33.992	26.71	2.01	0.180	0.180	0.417	30	30

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.25	0.46		32.521
8	0.23	0.42		32.528
26	0.28	0.34		32.524
45	0.28	0.33		32.520
100	0.02	0.00		33.342
11.78 16.81 - WATER COLUMN VALUES				
MESSENGER TIME 1650 INCOMING SOLAR RADIATION - AM 186 PM 186				

DEPTH	BROWN BEAR		CRUISE 318		STATION 054		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.87	0.00	32.537	0.000	25.07	289.6	0.000	0.00	6.79	0.00	0.98	
10	9.89	0.00	32.533	0.000	25.07	290.4	0.030	0.02	6.66	0.00		
20	9.86	0.00	32.531	0.000	25.07	290.3	0.059	0.06	6.65	0.00		
30	9.87	0.00	32.525	0.002	25.06	291.1	0.088	0.14	6.67	0.00		
50	9.84	0.01	32.567	0.009	25.10	287.8	0.147	0.37	6.62	0.03	0.87	
75	9.41	0.04	33.002	0.001	25.51	249.3	0.214	0.80	5.98	0.06	0.80	
100	8.35	0.01	33.401	0.005	25.99	204.5	0.271	1.31	4.05	0.02	0.73	
150	7.78	0.00	33.845	0.003	26.42	164.1	0.364	2.48	2.88	0.02	0.67	
200	7.31	0.00	33.954	0.000	26.57	150.2	0.443	3.89	2.34	0.01	3.56	
250	6.84	0.00	33.998	0.000	26.67	141.4	0.517	5.59	2.09	0.02	19.95	

BROWN BEAR CRUISE 318 STATION 055 OBSERVED VALUES																
DATE	8/03/63	HR	03.1	LAT	46-13 N	LONG	127-03 W	SNDG	2650	WEA	03	WIND	VEL	12	DIR	35
BAROM	22.0	TEMP	DRY	9.3	WET	8.2	RELHU	96	WTRCLR	SEA	3	DIR	36	SWELL	0	DIR
CLOUD	TYPE	7	AMT	2	VIS	8	WIRE	ANGLE(S)	27.10	SECDI						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	PHOS	NITR	SIL						
2	0	10.01	32.573	25.08	6.80	0.607	-0.051	0.77	3.5	7						
2	4	10.04	32.568	25.07	6.65	0.594	-0.038	0.81	4.2	8						
2	9	10.02	32.572	25.08	6.73	0.601	-0.045	0.78	4.2	8						
2	18	10.00	32.570	25.08	6.65	0.594	-0.038	0.75	3.6	7						
2	26	10.05	32.572	25.07	6.67	0.596	-0.040	0.84	4.6	9						
2	43	9.98	32.566	25.08	6.69	0.598	-0.041	0.87	4.1	8						
2	66	9.96	32.627	25.13	6.36	0.568	-0.012	0.93	6.3	9						
2	89	8.56	33.318	25.89	4.29	0.383	0.189	1.73	22.0	27						
2	111	8.18	33.598	26.17	3.76	0.336	0.240	2.02	27.3	32						
2	133	8.14	33.808	26.34	3.00	0.268	0.307	2.17	31.1	38						
2	168	7.74	33.906	26.47	2.63	0.235	0.345	2.25	34.1	43						
1	179	7.68	33.901	26.48	2.68	0.239	0.342	2.24	33.7	42						
1	269	6.73	33.990	26.68	2.42	0.216	0.378	2.45	35.8	54						
1	455	5.28	34.085	26.94	1.16	0.104	0.512	2.86	41.6	81						
1	690	4.42	34.239	27.16	0.32	0.029	0.599	3.11	45.1	107						
1	926	3.77	34.373	27.33	0.30	0.027	0.611	3.04	45.2	123						
1	1405	2.74	34.507	27.54	0.66	0.059	0.595	2.98	45.2	149						
1	1692	2.24	34.562	27.62	1.01	0.090	0.572	2.86	42.1	158						

BROWN BEAR CRUISE 318 STATION 055 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.50	0.59		32.575
8	0.51	0.29		32.574
26	0.48	0.34		32.568
45	0.57	0.49		32.577

22.86 17.05 - WATER COLUMN VALUES

MESSANGER TIME 1948 INCOMING SOLAR RADIATION - AM 186 PM 186

BROWN BEAR			CRUISE 318			STATION 055			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0 10 20 30	10.01	0.00	32.573	0.000	25.08	289.2	0.000	0.00	6.80	0.00	0.93 0.71 0.92				
	10.02	0.00	32.572	0.000	25.08	289.5	0.030	0.02	6.73	0.01					
	10.01	0.00	32.570	0.000	25.08	289.8	0.059	0.06	6.65	0.00					
	10.04	0.01	32.569	0.002	25.07	290.5	0.088	0.14	6.69	0.01					
50 75 100 150	10.04	0.05	32.547	0.019	25.05	292.5	0.147	0.38	6.70	0.05	0.75 0.66 0.64 0.72				
	9.43	0.00	32.884	0.041	25.42	258.5	0.216	0.82	5.56	0.13					
	8.29	0.02	33.486	0.013	26.06	197.2	0.274	1.32	3.95	0.07					
	7.98	0.01	33.869	0.015	26.41	165.2	0.365	2.47	2.78	0.06					
200 250 300 400	7.42	0.02	33.944	0.013	26.55	152.5	0.445	3.91	2.53	0.07	1.13 0.80 0.94 0.75				
	6.91	0.00	33.985	0.008	26.65	143.3	0.520	5.62	2.43	0.04					
	6.44	0.00	34.009	0.003	26.74	136.0	0.590	7.61	2.23	0.03					
	5.64	0.00	34.062	0.005	26.88	123.1	0.721	12.28	1.56	0.05					
500 600 700 800	5.07	0.02	34.114	0.002	26.99	113.4	0.840	17.78	0.93	0.00	0.81 0.68 0.95 0.60				
	4.67	0.03	34.179	0.002	27.08	104.9	0.950	23.99	0.54	0.00					
	4.39	0.00	34.245	0.000	27.17	97.6	1.053	30.81	0.31	0.00					
	4.10	0.00	34.306	0.001	27.25	90.7	1.148	38.14	0.25	0.03					
1000 1200 1500	3.59	0.00	34.401	0.003	27.37	79.3	1.320	53.95	0.33	0.01	0.94 0.89 0.90				
	3.14	0.01	34.464	0.005	27.47	70.9	1.472	71.10	0.46	0.01					
	2.57	0.00	34.524	0.002	27.57	61.6	1.674	98.93	0.77	0.00					

BROWN BEAR CRUISE 318 STATION 056 OBSERVED VALUES
DATE 8/03/63 HR 06.2 L^AT 46-14 N LONG 127-17 W SNDG 2697 WEA 03 WIND VEL 18 DIR 36
BAROM 23.7 TEMP DRY 9.0 WET 7.8 RELHU 85 WTRCLR SEA 2 DIR 36 SWELL 1 DIR 36
CLOUD TYPE 3 AMT 6 VIS 8 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AGU	SATN
1	0	9.80	32.532	25.08	7.39	0.660	-0.101	118	
1	5	9.82	32.524	25.07	7.46	0.666	-0.108	119	
1	10	9.79	32.528	25.08	8.51	0.760	-0.201	136	
1	19	9.78	32.530	25.08	6.77	0.605	-0.046	108	
1	29	9.81	32.525	25.07	7.50	0.670	-0.111	120	
1	47	9.79	32.526	25.08	7.64	0.682	-0.123	122	
1	70	9.72	32.548	25.11	6.85	0.612	-0.052	109	
1	95	8.48	33.122	25.75					
1	119	8.44	33.466	26.03	4.88	0.436	0.137	76	
1	142	8.24	33.697	26.24	4.27	0.381	0.193	66	
1	165	7.97	33.842	26.39	3.77	0.337	0.241	58	
1	190	7.55	33.936	26.53	2.99	0.267	0.316	46	
1	284	6.24	33.971	26.73	2.84	0.254	0.348	42	

INTERPOLATED AND COMPUTED VALUES											
BROWN BEAR			CRUISE 318			STATION 056					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.80	0.00	32.532	0.000	25.08	288.9	0.000	0.00	7.39	0.00	
10	9.79	0.00	32.528	0.000	25.08	289.2	0.030	0.02	8.51	0.00	
20	9.78	0.00	32.530	0.000	25.08	289.2	0.059	0.06	6.79	0.05	0.88
30	9.81	0.00	32.525	0.000	25.07	290.1	0.088	0.14	7.54	0.01	0.97
50	9.81	0.02	32.514	0.009	25.07	291.3	0.146	0.38	7.57	0.02	0.87
75	9.47	0.06	32.649	0.021	25.23	276.5	0.218	0.83	6.64	0.02	0.97
100	8.43	0.04	33.206	0.003	25.82	220.0	0.281	1.39	5.61	0.05	0.99
150	8.16	0.00	33.755	0.001	26.30	176.1	0.380	2.64	4.10	0.01	0.67
200	7.36	0.01	33.959	0.002	26.57	150.6	0.463	4.10	2.67	0.03	15.13
250	6.51	0.05	34.028	0.008	26.74	134.7	0.535	5.75	1.84	0.18	60.43

BROWN BEAR CRUISE 318 STATION 057 OBSERVED VALUES

DATE 8/03/63 HR 07.9 LAT 46-14 N LONG 127-31 W WEA 03 WIND VEL 15 DIR 36
 BAROM 23.4 TEMP DRY 8.8 WET 7.3 RELHU 81 WTRCLR SECDI SNDG 2706 SEA 2 DIR 36 SWELL 1 DIR 36
 CLOUD TYPE 3 AMT 7 VIS 7 WIRE ANGLE(S) 20.20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	9.72	32.510	25.08	7.86	0.702	-0.142	125	
2	5	9.75	32.504	25.07	6.91	0.617	-0.058	110	
2	10	9.77	32.509	25.07	8.94	0.798	-0.239	143	
2	20	9.74	32.508	25.07	7.33	0.655	-0.094	117	
2	30	9.75	32.509	25.07	6.83	0.610	-0.050	109	
2	48	9.74	32.509	25.07	7.05	0.630	-0.070	113	
2	72	9.67	32.515	25.09	6.84	0.611	-0.050	109	
2	97	8.52	32.725	25.43	7.78	0.695	-0.120	121	
2	121	8.01	33.243	25.92	4.94	0.441	0.138	76	
2	144	7.72	33.603	26.24	4.33	0.387	0.195	66	
2	170	7.51	33.778	26.41	3.76	0.336	0.248	57	
1	186	7.32	33.852	26.49	3.53	0.315	0.271	54	
1	279	6.20	33.947	26.72	2.63	0.235	0.367	39	
1	469	4.97	34.070	26.96	1.01	0.090	0.530	15	
1	709	4.16	34.263	27.21	0.28	0.025	0.607	4	
1	947	3.72	34.384	27.35	0.26	0.023	0.615	4	
1	1435	2.64	34.526	27.56	0.81	0.072	0.584	11	
1	1726	2.22	34.582	27.64	1.36	0.121	0.541	18	

BROWN BEAR CRUISE 318 STATION 057 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 150 PM 127
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0102-0112 DEPTHS 100, 70
 0131-0141 35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 057		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	9.72	0.00	32.510	0.000	25.08	289.3	0.000	0.00	7.86	0.00	0.91 0.85 0.83 0.78	
10	9.77	0.00	32.509	0.000	25.07	290.3	0.030	0.02	8.94	0.00		
20	9.74	0.00	32.508	0.000	25.07	290.1	0.059	0.06	7.33	0.00		
30	9.75	0.00	32.509	0.000	25.07	290.4	0.088	0.14	6.83	0.00		
50	9.75	0.01	32.506	0.002	25.07	291.0	0.147	0.38	7.02	0.02	0.91 0.85 0.83 0.78	
75	9.54	0.03	32.526	0.002	25.12	286.7	0.219	0.84	7.03	0.09		
100	8.43	0.01	32.785	0.008	25.49	251.3	0.287	1.45	7.46	0.11		
150	7.67	0.01	33.657	0.005	26.29	176.5	0.395	2.78	4.18	0.00		
200	7.14	0.01	33.885	0.012	26.54	153.0	0.478	4.26	3.37	0.01	1.56 1.52 0.96 0.75	
250	6.53	0.01	33.949	0.020	26.68	140.9	0.552	5.96	2.87	0.02		
300	6.02	0.01	33.962	0.002	26.75	134.0	0.621	7.92	2.42	0.01		
400	5.30	0.03	34.029	0.005	26.89	121.4	0.750	12.52	1.53	0.02		
500	4.83	0.01	34.096	0.002	27.00	102.9	0.868	17.94	0.85	0.01	0.86 0.67 0.94 0.63	
600	4.45	0.02	34.177	0.005	27.11	102.4	0.976	24.04	0.48	0.03		
700	4.18	0.00	34.256	0.001	27.20	94.3	1.076	30.67	0.29	0.00		
800	3.97	0.02	34.315	0.001	27.27	88.4	1.168	37.78	0.22	0.02		
1000	3.60	0.01	34.404	0.001	27.38	79.1	1.338	53.39	0.29	0.01	0.95 0.90 11.02	
1200	3.15	0.03	34.470	0.003	27.47	70.5	1.489	70.46	0.47	0.01		
1500	2.52	0.00	34.539	0.000	27.58	59.9	1.688	97.81	0.92	0.00		

BROWN BEAR CRUISE 318 STATION 058 OBSERVED VALUES
 DATE 8/03/63 HR 11.2 LAT 46-14 N LONG 127-46 W WEA 03 WIND VEL 20 DIR 36
 BAROM 24.4 TEMP DRY 7.9 WET 6.6 RELHU 83 WTRCLR SECDI 2725
 CLOUD TYPE 0 AMT 6 VIS 7 WIRE ANGLE(S) --- SEA 4 DIR 36 SWELL 4 DIR 36

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN		SATN
					ML/L	MGA/L	
1	0	9.87	32.540	25.08	6.62	0.591	106
1	5	9.86			6.64	0.593	
1	10	9.89	32.539	25.07	6.83	0.610	109
1	20	9.85	32.543	25.08	6.73	0.601	108
1	30	9.94	32.546	25.07	6.65	0.594	107
1	48	9.85	32.536	25.08	6.69	0.598	107
1	73	9.85	32.543	25.08	6.65	0.594	106
1	97	9.50	32.597	25.18	6.48	0.579	103
1	121	8.08	33.111	25.80	5.43	0.485	84
1	144	7.82	33.451	26.11	4.46	0.398	69
1	168	7.60	33.770	26.39	3.51	0.313	54
1	193	7.21	33.872	26.52	3.48	0.311	53
1	289	6.04	33.948	26.74	2.57	0.230	38

BROWN BEAR CRUISE 318 STATION 058 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL

0	0.15	0.10		32.536
8	0.16	0.05		32.531
26	0.17	0.10		32.542
45	0.20	0.11		32.544
100	0.04	0.02		32.642

7.82 3.98 - WATER COLUMN VALUES

MESSANGER TIME 0332 INCOMING SOLAR RADIATION - AM 150 PM 127

BROWN BEAR CRUISE 318 STATION 059 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.16	0.49	1.70	32.528
8	0.12	0.37		32.526
26	0.18	0.38		32.522
45	0.21	0.31		32.543
100	0.03	0.01		32.589

7.53 16.69 - WATER COLUMN VALUES

MESSENGER TIME 0549 INCOMING SOLAR RADIATION - AM 150 PM 127

DEPTH	BROWN BEAR CRUISE 318 STATION 059			INTERPOLATED AND COMPUTED VALUES					VAR RATIO		
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY		OXY ML/L	E(O)
0	9.70	0.00	32.529	0.000	25.10	287.6	0.000	0.00	7.21	0.00	
10	9.73	0.00	32.532	0.000	25.09	288.0	0.029	0.02	6.71	0.00	
20	9.70	0.00	32.531	0.000	25.10	287.8	0.058	0.06	6.52	0.00	
30	9.75	0.00	32.529	0.000	25.09	288.9	0.088	0.13	6.55	0.00	
50	9.73	0.00	32.532	0.001	25.09	288.7	0.146	0.37	6.69	0.01	0.95
75	9.65	0.00	32.522	0.005	25.10	288.7	0.218	0.84	7.03	0.00	0.89
100	9.08	0.02	32.638	0.007	25.28	271.7	0.289	1.47	6.47	0.02	0.88
150	7.61	0.01	33.562	0.000	26.22	182.7	0.404	2.88	4.69	0.00	1.18

BROWN BEAR CRUISE 318 STATION 060 OBSERVED VALUES
 DATE 8/03/63 HR 18.3 LAT 46-4 LONG 128-30 W SNGD 2697 WEA 02 WIND VEL 18 DIR 36
 BAROM 26.1 TEMP DRY 8.2 WTRCLR SECDI 22 SEA 1 DIR 36 SWELL 1 DIR 36
 CLOUD TYPE 3 AMT 6 VIS 5 SURF ANGLE(S) 25.11

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
2	0	9.97	32.548	25.07	7.48	0.668	-0.111	120
2	5		32.546		7.81	0.698		
2	10	9.97	32.547	25.07	6.31	0.564	-0.007	101
2	20	9.96	32.550	25.07	6.41	0.573	-0.016	103
2	30	10.00	32.553	25.07	6.31	0.564	-0.007	101
2	49	9.99	32.549	25.06	6.50	0.581	-0.024	104
2	74	9.95	32.553	25.07	6.62	0.591	-0.034	106
2	99	9.64	32.593	25.16	6.59	0.589	-0.028	105
2	124	8.14	33.083	25.77	5.40	0.482	0.096	83
2	148	7.72	33.430	26.10	4.42	0.395	0.188	68
2	173	7.58	33.742	26.37	3.71	0.331	0.252	57
1	182	7.57	33.762	26.39	3.54	0.316	0.268	54
1	272	6.43	33.921	26.67	3.07	0.274	0.325	46
1	456	4.88	34.020	26.93	1.27	0.113	0.508	18
1	688	4.16	34.201	27.16	0.41	0.037	0.596	6
1	921	3.52	34.343	27.33	0.40	0.036	0.606	6
1	1390	2.70	34.500	27.53	0.59	0.053	0.602	8
1	1672	2.24	34.555	27.62	1.01	0.090	0.572	14

BROWN BEAR		CRUISE 318		STATION 060		BIOLOGICAL DATA				
DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.15	0.23		0.22 0.23 0.20 0.12	100 78 59 41		32.539	0.80	1.8	3
8	0.12	0.23		0.21 0.00	21 5					
22	0.15	0.22				50 10	32.543 32.537	0.81 0.85	1.8 1.7	2 2
54	0.23	0.21				1	32.543	0.87	2.0	4
100	0.11	0.19					32.552	0.88	2.7	4
150	0.00						33.254	1.41	9.5	13
200	0.00						33.823	1.83	17.7	25

8.93 11.87 -- WATER COLUMN VALUES

MESSANGER TIME 1210 INCOMING SOLAR RADIATION -- AM 150 PM 127

LIGHT SATURATION INCUBATOR ILLUMINATION 18300

DEPTH	BROWN BEAR		CRUISE 318		STATION 060		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.97	0.00	32.548	0.000	25.07	290.4	0.000	0.00	7.48	0.00			
10	9.97	0.00	32.547	0.000	25.07	290.6	0.030	0.02	6.31	0.00			
20	9.96	0.00	32.550	0.000	25.07	290.4	0.059	0.06	6.41	0.00			
30	10.00	0.00	32.553	0.000	25.07	291.0	0.088	0.14	6.31	0.00			
50	9.99	0.00	32.549	0.000	25.06	291.6	0.147	0.38	6.51	0.00	0.95		
75	9.95	0.01	32.550	0.003	25.07	291.3	0.220	0.85	6.63	0.01	0.94		
100	9.58	0.01	32.614	0.004	25.18	281.2	0.293	1.49	6.55	0.01	0.94		
150	7.70	0.00	33.455	0.001	26.13	191.9	0.412	2.97	4.35	0.00	0.93		
200	7.41	0.06	33.879	0.053	26.50	157.2	0.500	4.53	3.33	0.09	3.03		
250	6.78	0.07	33.958	0.046	26.65	143.6	0.576	6.27	3.06	0.10	2.51		
300	6.13	0.00	33.945	0.007	26.72	136.8	0.646	8.26	2.80	0.05	0.94		
400	5.25	0.01	34.004	0.012	26.88	122.7	0.777	12.93	1.83	0.07	0.75		
500	4.69	0.03	34.053	0.003	26.98	113.4	0.896	18.42	1.01	0.02	0.81		
600	4.35	0.05	34.131	0.004	27.08	104.6	1.006	24.63	0.59	0.03	0.68		
700	4.12	0.00	34.209	0.000	27.17	97.2	1.108	31.42	0.40	0.01	0.83		
800	3.84	0.00	34.274	0.000	27.25	89.9	1.203	38.70	0.35	0.03	0.60		
1000	3.36	0.01	34.378	0.002	27.38	78.3	1.373	54.35	0.40	0.01	0.93		
1200	2.99	0.02	34.452	0.004	27.47	70.0	1.523	71.28	0.46	0.01	0.88		
1500	2.53	0.00	34.523	0.001	27.57	61.3	1.723	98.86	0.72	0.00	8.20		

BROWN BEAR CRUISE 318 STATION 061 OBSERVED VALUES
 DATE 8/03/63 HR 23.5 LAT 46-14 N LONG 129-01 W WEA 02 WIND VEL 22 DIR 36
 BAROM 26.8 TEMP DRY 8.4 WET 7.2 RELHU 85 WTRCLR SEA 7 DIR 36 SWELL 7 DIR 36
 CLOUD TYPE 2 AMT 6 VIS 6 WIRE ANGLE(S) 25,25,17

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
3	0	9.98	32.573	25.08	6.48	0.579	-0.022		104
3	5	10.03	32.566	25.07	6.62	0.591	-0.035		106
3	10	10.00	32.582	25.09	6.77	0.605	-0.049		109
3	10	9.98	32.574	25.08	6.59	0.589	-0.032		106
3	10	10.03	32.569	25.07	6.75	0.603	-0.047		108
3	10	10.03	32.566	25.07	6.78	0.606	-0.050		109
3	13	9.91	32.564	25.09	6.64	0.593	-0.036		106
3	18	8.69	32.567	25.2	6.69	0.598	-0.024		104
3	22	7.20	32.995	25.84	5.98	0.534	0.058		90
3	70	7.37	33.771	26.42	4.07	0.364	0.223		62
1	131	7.28	33.868	26.51	3.32	0.297	0.290		51
1	175	6.16	33.934	26.71	2.87	0.256	0.346		43
1	453		34.053		1.05	0.094			5
1	583	4.02	34.233	27.20	0.36	0.032	0.602		3
1	712	3.46	34.366	27.36	0.24	0.021	0.621		3
2	1431	2.54	34.496	27.55	0.62	0.055	0.602		8

DEPTH	BROWN BEAR		CRUISE 318		STATION 061		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.98	0.00	32.573	0.000	25.08	288.7	0.000	0.00	6.48	0.00		
10	10.00	0.00	32.582	0.000	25.09	288.5	0.030	0.02	6.77	0.00		
20	9.98	0.00	32.574	0.000	25.08	289.0	0.059	0.06	6.59	0.00		
30	10.03	0.00	32.569	0.000	25.07	290.3	0.088	0.14	6.75	0.00		
50	10.04	0.01	32.566	0.000	25.07	291.0	0.146	0.38	6.77	0.00	0.95	
75	9.84	0.01	32.556	0.005	25.09	289.1	0.219	0.84	6.66	0.01	0.89	
100	8.55	0.02	32.595	0.006	25.33	267.1	0.290	1.47	6.65	0.01	0.89	
150	7.05	0.17	33.475	0.010	26.23	181.6	0.403	2.87	4.72	0.15	0.75	
200	7.14	0.07	33.957	0.050	26.60	147.7	0.486	4.34	3.28	0.02	0.99	
250	6.54	0.07	34.001	0.057	26.72	137.1	0.557	5.99	2.90	0.08	0.74	
300	5.94	0.03	33.950	0.001	26.75	134.0	0.626	7.92	2.62	0.05	1.11	
400	5.19	0.10	34.017	0.001	26.90	121.0	0.754	12.51	1.60	0.08	1.50	
500	4.62	0.12	34.090	0.002	27.02	109.8	0.871	17.87	0.81	0.04	1.48	
600	4.22	0.08	34.169	0.003	27.13	100.3	0.977	23.85	0.47	0.05	1.11	
700	3.97	0.00	34.244	0.000	27.21	92.8	1.075	30.35	0.34	0.00	0.91	
800	3.70	0.02	34.307	0.000	27.29	85.9	1.165	37.31	0.25	0.02	0.59	
1000	3.31	0.01	34.405	0.000	27.40	75.8	1.328	52.36	0.29	0.02	10.39	
1200	2.99	0.03	34.468	0.000	27.48	68.9	1.475	68.88	0.47	0.04	15.35	

BROWN BEAR CRUISE 318 STATION 062 OBSERVED VALUES
 DATE 9/03/63 HR 06.7 LAT 45-44 N LONG 129-27 W WEA 00 WIND VEL 30 DIR 36
 BAROM 28.1 TEMP DRY 9.2 WET 8.1 RELHU 86 WTRCLR SEA 2 DIR 36 SWELL 3 DIR 36
 CLOUD TYPE 3 AMT 1 VIS 7 WIRE ANGLE(S) 25.20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
2	0	9.84	32.553	25.09	6.57	0.587	-0.029	105
2	5	9.86	32.557	25.09	6.55	0.585	-0.027	105
2	9	9.88	32.564	25.09	6.59	0.589	-0.031	106
2	18	9.83	32.558	25.10	6.65	0.594	-0.036	106
2	28	9.82	32.565	25.10	6.54	0.584	-0.026	105
2	46	9.88	32.556	25.09	6.54	0.584	-0.026	105
2	69	9.23	32.574	25.21	6.47	0.578	-0.012	102
2	93	8.11	32.774	25.53	6.02	0.538	0.042	93
2	117	7.13	32.973	25.63	5.87	0.524	0.069	88
1	179	6.99	33.717	26.43	4.39	0.392	0.204	66
1	451	4.71	34.065	26.99	1.02	0.091	0.533	15
1	679	4.02	34.228	27.19	0.40	0.036	0.599	6
1	911	3.50	34.373	27.36	0.24	0.021	0.621	3
1	1369	2.56	34.510	27.56	0.56	0.050	0.607	8

BROWN BEAR CRUISE 318 STATION 062 BIOLOGICAL DATA
 INCOMING SOLAR RADIATION - AM 124 PM 91
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0035-0045 DEPTHS 100, 70
 35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 062		INTERPOLATED AND COMPUTED VALUES						
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.84	0.00	32.553	0.000	25.09	288.0	0.000	0.00	6.57	0.00			
10	9.88	0.00	32.564	0.001	25.09	287.9	0.030	0.02	6.60	0.00	0.97		
20	9.82	0.00	32.559	0.001	25.10	287.6	0.058	0.06	6.63	0.01	0.78		
30	9.84	0.01	32.564	0.001	25.10	287.6	0.087	0.13	6.53	0.00	0.93		
50	9.81	0.01	32.552	0.003	25.10	288.5	0.146	0.37	6.54	0.01	0.82		
75	8.96	0.02	32.615	0.006	25.28	271.3	0.216	0.82	6.36	0.02	0.73		
100	7.79	0.01	32.830	0.002	25.62	238.9	0.280	1.39	5.97	0.02	0.69		
150	6.85	0.15	33.364	0.024	26.17	187.2	0.388	2.74	5.16	0.08	0.86		
200	6.83	0.05	33.831	0.054	26.54	152.9	0.473	4.26	3.99	0.03	1.15		
250	6.45	0.14	34.045	0.147	26.76	132.7	0.545	5.91	3.13	0.07	1.44		
300	6.05	0.18	34.175	0.189	26.92	118.5	0.609	7.69	2.40	0.09	1.50		
400	5.18	0.11	34.187	0.116	27.03	108.2	0.723	11.78	1.35	0.06	1.01		
500	4.51	0.03	34.106	0.003	27.04	107.4	0.832	16.81	0.78	0.04	0.73		
600	4.19	0.04	34.179	0.004	27.14	99.2	0.936	22.69	0.48	0.06	0.66		
700	3.97	0.00	34.243	0.000	27.21	92.9	1.033	29.17	0.37	0.00	0.89		
800	3.74	0.01	34.308	0.001	27.28	86.3	1.124	36.14	0.27	0.01	0.59		
1000	3.32	0.01	34.418	0.001	27.41	75.0	1.287	51.13	0.26	0.01	9.83		
1200	2.93	0.01	34.490	0.003	27.51	66.6	1.430	67.28	0.41	0.02	10.55		

DATE 9/03/63 HR 15.4 LAT 45-12 N LONG 130-00 W
BAROM 31.8 TEMP DRY 8.3 WET 6.9 RELHU 82 WTRCLR
CLOUD TYPE 6 AMT 9 VIS 7 WIRE ANGLE'S 35, 38, 25, 25
SNDG 2212 WEA 03 WIND VEL 25 DIR 35
SECD1 SEA 3 DIR 35 SWELL 3 DIR 35

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	--	--	--	OXYGEN	--	--	PHOS	NITR	SIL
						MG/L	MG/L	MG/L	AOU	SATN				
3	0	9.54	32.537	25.13	6.98	0.623	-0.061	111	0.90	3.9	7			
3	5	9.57	32.534	25.12	6.77	0.605	-0.043	108	0.91	4.3	6			
3	10	9.54	32.537	25.13	6.59	0.589	-0.026	105	0.89	3.9	7			
3	19	9.53	32.535	25.13	6.93	0.619	-0.057	110	0.87	3.9	6			
3	28	9.58	32.542	25.13	7.04	0.629	-0.067	112	0.91	3.7	7			
1	39	9.60	32.547	25.13	6.51	0.581	-0.020	104	0.89	4.5	6			
3	45	9.58	32.541	25.12	7.24	0.647	-0.085	115	0.91	3.9	6			
1	61	9.63	32.545	25.12	6.55	0.585	-0.024	104	0.91	3.7	6			
3	69	9.53	32.545	25.14	7.05	0.630	-0.067	112	0.93	4.0	6			
1	82	9.51	32.559	25.15	6.43	0.574	-0.012	102	0.96	4.3	7			
3	92	9.30	32.537	25.17	6.69	0.598	-0.032	106	1.02	4.3	6			
3	115	8.30	32.717	25.46	6.47	0.578	0.000	100	1.20	9.7	13			
1	123	6.77	33.101	25.98	5.86	0.523	0.074	88	1.55	20.2	24			
1	146	6.64	33.454	26.27	5.22	0.466	0.132	78	1.60	21.8	30			
1	166	6.89	33.684	26.42	4.75	0.424	0.169	72	1.61	23.7	34			
4	185	7.08	33.826	26.51	4.54	0.405	0.184	69	1.85	30.5	53			
1	249	6.14	33.929	26.73	3.42	0.305	0.313	48	1.99	32.4	55			
4	276	6.01	33.955	26.85	3.27	0.292	0.405	35	2.19	37.4	75			
4	374	5.13	33.983	26.93	2.39	0.213	0.470	25	2.48	39.0	86			
1	423	4.62	34.220	27.19	1.75	0.156	0.596	6	2.53	44.3	107			
1	640	4.00	34.429	27.44	0.43	0.038	0.616	5	2.94	42.2	121			
1	1081	3.14	34.492	27.53	0.36	0.032	0.612	7	2.92	43.9	133			
1	1303	2.73	34.545	27.60	0.48	0.043	0.587	11	3.01	41.8	150			
1	1526	2.35	34.545	27.60	0.83	0.074	0.587		2.80					
1	1748	2.09												
1	1882	1.98												
2	2048	1.94	34.619	27.69	1.60	0.143	0.524	21	2.90	41.0	147			

BROWN BEAR CRUISE 318 STATION 063 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.12	0.38	3.14	0.37	100	50	32.565	0.98	2.3	3
7	0.13	0.27	1.86	0.35	78		32.563	0.91	3.4	6
				0.26	59					
				0.25	41					
				0.19	21					
				0.03	5					
24	0.17		0.52			10	32.564	0.93	3.0	6
51	0.21	0.16								
100	0.14	0.15	0.26			1	32.563	0.92	3.5	6
							32.565	0.93	3.4	5
8.51	11.74	48.26	-	WATER COLUMN VALUES						
MESSENGER TIME 1130 INCOMING SOLAR RADIATION - AM 124 PM 91										

BROWN BEAR		CRUISE 318		STATION 063		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.54	0.00	32.537	0.000	25.13	284.5	0.000	0.00			0.00
10	9.54	0.00	32.537	0.000	25.13	284.7	0.029	0.02			0.00
20	9.53	0.00	32.536	0.000	25.13	284.9	0.058	0.06			0.00
30	9.59	0.00	32.544	0.000	25.13	285.3	0.087	0.13			0.00
50	9.61	0.02	32.541	0.001	25.12	286.1	0.144	0.37	6.54	0.01	1.08
75	9.53	0.02	32.553	0.003	25.14	284.4	0.216	0.83	6.49	0.00	0.77
100	8.71	0.22	32.628	0.043	25.33	267.0	0.285	1.45	6.25	0.01	0.98
150	6.68	0.01	33.506	0.000	26.31	174.4	0.397	2.82	5.11	0.00	0.75
200	6.96	0.08	33.878	0.020	26.56	151.0	0.479	4.28	4.29	0.03	1.39
250	6.21	0.05	33.952	0.030	26.72	136.5	0.551	5.95	3.50	0.06	1.22
300	5.79	0.01	33.938	0.004	26.76	133.0	0.619	7.86	3.06	0.03	0.79
400	4.85	0.01	33.969	0.000	26.90	120.6	0.747	12.43	2.05	0.01	0.53
500	4.24	0.10	34.062	0.010	27.04	107.7	0.862	17.73	1.09	0.06	1.51
600	4.01	0.06	34.173	0.007	27.15	97.7	0.966	23.57	0.55	0.04	0.94
700	3.87	0.01	34.262	0.005	27.24	90.3	1.061	29.90	0.31	0.06	0.95
800	3.65	0.02	34.323	0.010	27.31	84.2	1.149	36.69	0.18	0.12	0.95
1000	3.28	0.01	34.408	0.006	27.41	75.1	1.310	51.53	0.23	0.08	0.94
1200	2.92	0.00	34.465	0.001	27.49	68.2	1.456	67.91	0.40	0.01	0.60
1500	2.39	0.00	34.539	0.000	27.59	58.4	1.648	94.47	0.78	0.00	0.85
2000	1.94	0.00	34.616	0.000	27.69	49.7	1.923	143.51	1.57	0.01	16.06

OXYGENS FROM CAST THREE WERE NOT USED FOR INTERPOLATION.

BROWN BEAR CRUISE 318 STATION 63X INTERPOLATED AND COMPUTED VALUES
STATION 63X CONSISTS OF INTERPOLATED OXYGEN VALUES FROM
CAST 3 OF STATION 63.

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0									6.98	0.00	0.00
10									6.59	0.00	0.00
20									6.95	0.00	0.86
30									7.07	0.00	0.94
50									7.23	0.01	1.08
75									6.96	0.01	0.77
100									6.58	0.01	4.60

BROWN BEAR CRUISE 318 STATION 63A BIOLOGICAL DATA

DATE 9/03/63 LAT 45-12 N LONG 130-00 W

DEPTH CHL-A PRODUCTIVITY SAL
LAB-I DECK-I

0 0.19 32.555

MESSENGER TIME 0620 INCOMING SOLAR RADIATION - AM 124 PM 91

BROWN BEAR CRUISE 318 STATION 064 OBSERVED VALUES

DATE 10/03/63 MR 12.1 LAT 45-13 N LONG 127-59 W SMDG 2760 WEA 02 WIND VEL 30 DIR 36
 BAROM 29.5 TEMP DRY 8.8 WET 7.1 RELHU 79 WTRCLR SECDI SEA 4 DIR 35 SWELL 7 DIR 35
 CLOUD TYPE VIS WIRE ANGLE(S) 55

CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN PHOS NITR SIL

1 310 5.91 33.948 26.75 2.53 0.226 0.380 37 2.36 34.1 63

BROWN BEAR CRUISE 318 STATION 064 INTERPOLATED AND COMPUTED VALUES

NO INTERPOLATED AND COMPUTED VALUES FOR THIS STATION.

BROWN BEAR CRUISE 318 STATION 64A BIOLOGICAL DATA

DATE 10/03/63 LAT 45-05 N LONG 127-56 W

DEPTH CHL-A PRODUCTIVITY SAL

LAB-I DECK-I

0 0.27 32.587

MESSENGER TIME 0601 INCOMING SOLAR RADIATION - AM 181 PM 158

BROWN BEAR CRUISE 318 STATION 065 OBSERVED VALUES												
DATE 10/03/63		HR 22.1	LAT 44-13 N	LONG 127-59 W	SDNG 2816	WEA 02	WIND VEL 28	DIR 34				
BAROM 32.2		TEMP DRY 9.8	WET 8.2	RELHU 81	WTRCLR	SECDI 20	SEA 7	DIR 36	SWELL 7			
CLOUD TYPE 8		AMT 4	VIS 7	WIRE ANGLE(S) 43.---								
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MGA/L	AOU	SATN	PHOS	NITR	SIL
2	0	10.29	32.579	25.04	6.65	0.594	0.594	-0.041	107	0.76	3.0	5
2	5	10.32	32.575	25.03	6.56	0.586	0.586	-0.034	106	0.81	2.8	4
2	10	10.30	32.575	25.03	6.65	0.594	0.594	-0.042	108	0.79	2.8	5
2	20	10.28	32.575	25.04	6.45	0.576	0.576	-0.023	104	0.79	3.4	4
2	30	10.33	32.575	25.03	6.49	0.580	0.580	-0.028	105	0.81	2.6	4
2	49	10.31	32.574	25.03	6.51	0.581	0.581	-0.029	105	0.79	2.7	4
2	74	10.29	32.582	25.05	6.57	0.587	0.587	-0.034	106	0.82	2.8	5
2	99	9.05	32.774	25.39	5.92	0.529	0.529	0.039	93	1.19	10.4	12
2	123	8.08	33.208	25.88	5.06	0.452	0.452	0.127	78	1.55	18.0	21
2	147	7.93	33.605	26.21	4.09	0.365	0.365	0.214	63	1.89	25.4	31
2	175	7.74	33.846	26.43	3.60	0.322	0.322	0.259	55	2.02	29.1	37
1	329	5.99	33.975	26.77	2.41	0.215	0.215	0.390	36	2.40	28.9	61
1	412	5.25	34.008	26.88	1.73	0.155	0.155	0.462	25	2.58	39.4	78
1	581	4.51	34.153	27.08	0.60	0.054	0.054	0.573	9	2.93	44.0	101
1	788	4.01	34.318	27.26	0.32	0.029	0.029	0.606	5	3.04	43.6	112
1	1000	3.62	34.412	27.38						3.04	43.4	125
1	1430		34.525		0.72	0.064				2.96	40.2	123
1	1687	2.28	34.571	27.63	1.15	0.103		0.559	16	3.04	40.7	149

BROWN BEAR CRUISE 318 STATION 065 BIOLOGICAL DATA			
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL
0	0.26		32.570
7	0.19	0.41	32.564
24	0.30	0.34	32.561
51	0.34	0.48	32.586
100	0.02	0.00	32.581
14.46 20.32 - WATER COLUMN VALUES			
MESSENGER TIME 1500 INCOMING SOLAR RADIATION - AM 181 PM 158			

DEPTH	BROWN BEAR		CRUISE 318		STATION 065		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E'(O)	VAR RATIO	
0	10.29	0.00	32.579	0.000	25.04	293.2	0.000	0.00	6.65	0.00		
10	10.30	0.00	32.575	0.000	25.03	293.8	0.030	0.02	6.65	0.00		
20	10.28	0.00	32.575	0.000	25.04	293.7	0.060	0.06	6.45	0.00		
30	10.33	0.00	32.575	0.000	25.03	294.7	0.089	0.14	6.49	0.00		
50	10.32	0.01	32.572	0.001	25.03	295.1	0.149	0.38	6.52	0.00	0.95	
75	10.25	0.01	32.585	0.001	25.05	293.5	0.223	0.86	6.55	0.00	0.94	
100	9.00	0.00	32.790	0.002	25.41	259.3	0.292	1.48	5.89	0.00	0.94	
150	7.91	0.00	33.638	0.003	26.24	181.3	0.403	2.85	4.02	0.01	0.90	
200	7.48	0.04	33.939	0.044	26.54	153.7	0.488	4.35	3.32	0.06	1.52	
250	6.93	0.07	34.041	0.081	26.69	139.4	0.562	6.05	2.87	0.11	1.99	
300	6.35	0.04	34.031	0.049	26.77	133.1	0.630	7.99	2.54	0.07	1.24	
400	5.34	0.00	34.003	0.001	26.87	123.8	0.760	12.63	1.83	0.00	0.77	
500	4.78	0.03	34.078	0.005	26.99	112.7	0.879	18.12	1.07	0.02	0.78	
600	4.45	0.00	34.170	0.001	27.10	103.0	0.988	24.26	0.54	0.01	0.91	
700	4.19	0.01	34.253	0.002	27.19	94.7	1.088	30.91	0.35	0.04	0.67	
800	3.99	0.00	34.325	0.000	27.27	87.9	1.181	38.01	0.31	0.00	1.01	
1000	3.62	0.00	34.412	0.000	27.38	78.8	1.349	53.54	0.29	0.04	1.25	
1200	3.30	0.02	34.474	0.002	27.46	72.0	1.502	70.77	0.41	0.04	27.79	
1500	2.75	0.03	34.538	0.000	27.56	62.7	1.707	99.04	0.83	0.00	28.85	

BROWN BEAR CRUISE 318 STATION 066 OBSERVED VALUES
 DATE 11/03/63 HR 10.1 LAT 44-12 N LONG 127-45 W SNOG 2816 WEA 02 WIND VEL 28 DIR 32
 BAROM 28.8 TEMP DRY 8.8 WET 7.8 RELHU 88 WTRCLR SECDI SEA 7 DIR 33 SWELL 6 DIR 33
 CLOUD TYPE 9 AMT 3 VIS 7 WIRE ANGLE(S) 30

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
1	0	10.65	32.655	25.03	7.06	0.631	-0.083	115
1	5	10.67	32.657	25.03	6.51	0.581	-0.034	106
1	9	10.64	32.659	25.04	6.21	0.555	-0.007	101
1	18	10.60	32.664	25.05	6.45	0.576	-0.028	105
1	25	10.67	32.688	25.06	7.06	0.631	-0.083	115
1	41	10.66	32.715	25.08				
1	63	10.64	32.681	25.06	6.77	0.605	-0.057	110
1	84	10.33	32.840	25.23	6.43	0.574	-0.023	104
1	106	8.48	33.154	25.78	5.68	0.507	0.066	88
1	126	8.07	33.476	26.09	5.27	0.471	0.107	81
1	147	7.94	33.736	26.31	4.11	0.367	0.211	63
1	168	7.76	33.903	26.47	3.47	0.310	0.270	53
1	251	6.35	33.967	26.71	3.12	0.279	0.321	46

BROWN BEAR CRUISE 318 STATION 066				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.65	0.00	32.655	0.000	25.03	293.4	0.000	0.00	7.06	0.00	
10	10.63	0.00	32.659	0.000	25.04	293.0	0.030	0.02	6.19	0.01	0.97
20	10.62	0.00	32.670	0.001	25.05	292.2	0.060	0.06	6.62	0.02	0.67
30	10.68	0.01	32.701	0.000	25.06	291.1	0.089	0.14	7.21	0.11	1.41
50	10.67	0.01	32.694	0.012	25.06	291.9	0.148	0.38	7.24	0.21	1.65
75	10.57	0.05	32.752	0.002	25.12	286.4	0.220	0.84	6.61	0.01	0.64
100	8.99	0.10	33.059	0.004	25.62	239.2	0.287	1.43	5.89	0.02	0.73
150	7.92	0.00	33.765	0.001	26.34	172.0	0.390	2.72	4.00	0.01	0.84
200	7.37	0.01	34.057	0.011	26.65	143.4	0.470	4.13	3.16	0.08	53.78
250	6.38	0.00	33.973	0.000	26.71	137.1	0.540	5.76	3.13	0.01	53.42

BROWN BEAR CRUISE 318 STATION 067 OBSERVED VALUES
 DATE 11/03/63 HR 15.2 LAT 44-13 N LONG 127-31 W WEA 03 WIND VEL 30 DIR 32
 BAROM 27.4 TEMP DRY 8.6 WET 7.8 RELHU 90 WTRCLR SEA 2 DIR 32 SWELL 4 DIR 35
 CLOUD TYPE 6 AMT 7 VIS 7 WIRE ANGLE(S) 38.15
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AU SATN
 2 0 10.81 32.701 25.04 6.36 0.568 -0.022 104
 2 5 10.84 32.695 25.03 6.21 0.555 -0.009 102
 2 10 10.81 32.732 25.07 6.54 0.584 -0.039 107
 2 20 10.78 32.735 25.07 6.47 0.578 -0.032 106
 2 30 10.86 32.730 25.06 6.47 0.578 -0.033 106
 2 49 10.83 32.732 25.06 6.76 0.604 -0.058 111
 2 74 10.81 32.732 25.07 5.68 0.507 0.204 71
 2 100 9.47 32.970 25.27 3.58 0.320 0.388 45
 2 126 8.21 33.003 25.70 2.87 0.256 0.450 36
 2 149 7.91 33.806 26.37 2.03 0.181 0.425 30
 2 174 7.61 33.927 26.51 1.67 0.149 0.468 24
 1 333 5.89 33.997 26.80 0.52 0.046 0.579 7
 1 419 5.16 34.008 26.89 0.27 0.024 0.616 4
 1 589 4.59 34.181 27.09 0.87 0.078 1.13 0.101 0.562 15
 1 1019 3.59 34.421 27.39 34.575 27.63 1.13 0.101 0.562 15
 1 1452 2.74 34.575 27.63 1.13 0.101 0.562 15
 1 1714 2.24 34.575 27.63 1.13 0.101 0.562 15

BROWN BEAR CRUISE 318 STATION 067 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.27	0.57	32.576
7	0.23	0.52	32.580
24	0.23	0.43	32.579
51	0.24	0.42	32.579

11.95 23.39 - WATER COLUMN VALUES

MESSANGER TIME 0613 INCOMING SOLAR RADIATION - AM 122 PM 172

BROWN BEAR CRUISE 318 STATION 067				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.81	0.00	32.701	0.000	25.04	292.7	0.000	0.00	6.36	0.00	1.07
10	10.81	0.00	32.732	0.000	25.07	290.6	0.030	0.02	6.54	0.00	
20	10.78	0.00	32.735	0.000	25.07	290.1	0.059	0.06	6.47	0.00	
30	10.86	0.00	32.730	0.000	25.06	292.0	0.088	0.14	6.43	0.00	
50	10.84	0.01	32.730	0.001	25.06	292.1	0.147	0.38	6.49	0.01	0.95
75	10.77	0.01	32.741	0.003	25.08	290.6	0.221	0.85	6.73	0.01	0.95
100	9.47	0.00	32.970	0.000	25.48	253.1	0.289	1.46	5.68	0.00	0.96
150	7.90	0.00	33.819	0.005	26.38	167.7	0.395	2.76	3.55	0.00	
200	7.30	0.00	33.982	0.026	26.60	148.0	0.475	4.18	2.51	0.14	1.71
250	6.74	0.01	34.040	0.048	26.72	136.9	0.547	5.83	2.06	0.25	2.38
300	6.21	0.00	34.035	0.031	26.78	131.1	0.614	7.74	1.93	0.17	1.44
400	5.30	0.00	34.004	0.002	26.87	123.3	0.742	12.34	1.75	0.01	0.69
500	4.81	0.04	34.081	0.010	26.99	112.8	0.862	17.82	1.12	0.05	0.76
600	4.56	0.00	34.190	0.001	27.10	102.8	0.970	23.95	0.48	0.01	1.00
700	4.29	0.02	34.262	0.006	27.19	95.2	1.071	30.62	0.23	0.09	0.99
800	4.05	0.02	34.323	0.007	27.27	88.7	1.164	37.78	0.11	0.12	0.91
1000	3.63	0.00	34.415	0.001	27.38	78.7	1.333	53.37	0.23	0.02	0.93
1200	3.22	0.01	34.468	0.007	27.46	71.5	1.485	70.53	0.48	0.04	37.65
1500	2.65	0.00	34.525	0.011	27.56	62.5	1.689	98.67	0.94	0.00	33.02

BROWN BEAR CRUISE 318 STATION 068 OBSERVED VALUES
 DATE 11/03/63 HR 23.4 LAT 44-13 N LONG 127-18 W WEA 02 WIND VEL 35 DIR 33
 BAROM 25.1 TEMP DRY 9.5 WET 7.3 RELHU 74 WTRCLR SEA 5 DIR 32 SWELL 6 DIR 32
 CLOUD TYPE 1 AMT 4 VIS 7 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.17	32.608	25.08	6.80	0.607	-0.053		110
1	5	10.21	32.567	25.04	6.79	0.606	-0.053		110
1	10	10.18	32.567	25.05	6.72	0.600	-0.046		108
1	19	10.14	32.580	25.06					
1	29	10.22	32.571	25.04	6.85	0.612	-0.058		111
1	47	10.20	32.571	25.05	6.58	0.588	-0.034		106
1	70	10.17	32.573	25.05	6.58	0.588	-0.034		106
1	94	9.50	32.668	25.24	6.07	0.542	0.020		96
1	117	8.55	33.172	25.78	5.12	0.457	0.115		80
1	140	8.14	33.534	26.12	4.34	0.388	0.189		67
1	165	7.82	33.827	26.40	3.27	0.292	0.288		50
1	188	7.56	33.938	26.53	2.84	0.254	0.329		44
1	281	6.12	33.957	26.74	2.62	0.234	0.369		39

BROWN BEAR CRUISE 318 STATION 68A BIOLOGICAL DATA

DATE 12/03/63 LAT 44-18 N LONG 127-05 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	PROD	LIGHT SAT FILT	SAL
0	0.34	1.21	5.10	0.58	100	32.675
				0.64	78	
				0.62	59	
				0.53	41	
				0.31	21	
				0.00	5	

MESSANGER TIME 0600 INCOMING SOLAR RADIATION - AM 141 PM 131
LIGHT SATURATION INCUBATOR ILLUMINATION 18000

BROWN BEAR			CRUISE 318			STATION 068		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.17	0.00	32.608	0.000	25.08	289.1	0.000	0.0	6.80	0.00		
10	10.18	0.00	32.567	0.000	25.05	292.5	0.030	0.02	6.72	0.00		
20	10.15	0.00	32.580	0.000	25.06	291.2	0.059	0.06	6.78	0.04	1.24	
30	10.22	0.00	32.571	0.000	25.04	293.3	0.089	0.14	6.84	0.01	0.97	
50	10.21	0.01	32.569	0.002	25.04	293.7	0.148	0.38	6.58	0.02	0.86	
75	10.07	0.01	32.571	0.009	25.07	291.7	0.221	0.85	6.52	0.00	0.77	
100	9.24	0.03	32.787	0.018	25.37	263.2	0.291	1.48	5.84	0.02	0.71	
150	8.00	0.00	33.668	0.003	26.25	180.3	0.403	2.86	3.89	0.03	0.67	
200	7.43	0.01	33.954	0.008	26.56	151.8	0.487	4.34	2.76	0.03	15.44	
250	6.75	0.03	34.074	0.031	26.75	134.5	0.559	6.00	2.26	0.11	52.15	

BROWN BEAR CRUISE 318 STATION 069 OBSERVED VALUES

DATE 12/03/63 HR 16.7 LAT 44-15 N LONG 127-05 W SNOG 2834 WEA 02 WIND VEL 28 DIR 35
 BAROM 27.8 TEMP DRY 9.3 WET 6.9 RELHU 71 WTRCLR SECDI SEA 4 DIR 35 SWELL 3 DIR 35
 CLOUD TYPE 6 AMT 6 VIS 7 WIRE ANGLE(S) 32.18

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	PHOS	NITR	SIL
					MGA/L	AOU			
2	0	10.62	32.697	25.07	6.33	0.565	0.85	3.0	5
2	5	10.64	32.717	25.08	6.29	0.562	0.83	2.1	4
2	10	10.61	32.690	25.07	6.31	0.564	0.84	2.7	4
2	19	10.58	32.698	25.08	6.28	0.561	0.82	2.8	5
2	28	10.65	32.704	25.07	6.28	0.561	0.82	2.7	4
2	45	10.63	32.688	25.06	6.22	0.556	0.79	2.5	4
2	68	10.55	32.692	25.08	6.26	0.559	0.85	3.1	5
2	90	8.05	33.112	25.81	5.23	0.467	1.48	16.6	19
2	113	8.28	33.396	26.00	4.45	0.397	1.82	22.3	25
2	134	8.04	33.716	26.28	3.63	0.324	2.11	28.3	34
2	157	7.74	33.899	26.47	2.97	0.265	2.21	32.1	39
1	262	6.51	33.977	26.70			2.16	24.2	29
1	444	5.17	34.046	26.92	1.29	0.115	2.81	42.8	84
1	674	4.40	34.246	27.17	0.46	0.041	3.04	45.0	108
1	906	3.95	34.375	27.32	0.26	0.023	3.04	43.7	125
1	1371	2.78	34.520	27.54	0.62	0.055	3.12	42.8	156
1	1652	2.51	34.538	27.58	0.81	0.072	2.97	43.7	166

BROWN BEAR		CRUISE 318			STATION 069		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR. RATIO
0	10.62	0.00	32.697	0.000	25.07	289.8	0.000	0.00	6.33	0.00	
10	10.61	0.00	32.690	0.000	25.07	290.4	0.030	0.02	6.31	0.00	
20	10.59	0.00	32.699	0.000	25.08	289.5	0.059	0.06	6.28	0.00	0.86
30	10.65	0.00	32.703	0.001	25.07	290.6	0.088	0.14	6.27	0.00	0.94
50	10.73	0.07	32.669	0.012	25.03	294.7	0.147	0.38	6.27	0.04	0.80
75	9.74	0.18	32.811	0.020	25.31	268.6	0.218	0.83	5.97	0.05	0.68
100	8.00	0.14	33.241	0.009	25.91	211.3	0.278	1.36	4.88	0.02	0.66
150	7.83	0.00	33.856	0.004	26.42	164.0	0.373	2.55	3.15	0.01	0.60
200	7.20	0.00	34.008	0.049	26.63	144.8	0.451	3.93	2.31	0.24	3.16
250	6.64	0.00	34.000	0.020	26.70	138.5	0.522	5.58	1.72	0.42	5.66
300	6.16	0.01	33.992	0.004	26.76	133.6	0.591	7.52	1.33	0.48	6.35
400	5.42	0.01	34.030	0.005	26.88	122.8	0.720	12.14	1.13	0.25	2.18
500	4.92	0.02	34.092	0.006	26.99	113.2	0.839	17.63	1.04	0.01	0.77
600	4.57	0.03	34.179	0.007	27.09	103.7	0.949	23.80	0.67	0.01	0.70
700	4.34	0.01	34.263	0.001	27.19	95.7	1.050	30.52	0.42	0.01	0.86
800	4.14	0.02	34.323	0.001	27.26	89.8	1.144	37.74	0.30	0.02	0.59
1000	3.69	0.03	34.416	0.000	27.38	79.3	1.315	53.49	0.29	0.03	0.92
1200	3.18	0.05	34.484	0.000	27.48	69.8	1.466	70.50	0.43	0.04	0.88
1500	2.58	0.01	34.535	0.000	27.57	61.0	1.665	97.98	0.74	0.01	7.25

BROWN BEAR CRUISE 318 STATION 070 OBSERVED VALUES

DATE 12/03/63 HR 20.2 LAT 44-14 N LONG 126-51 W WIND VEL 15 DIR 35
 BAROM 28.8 TEMP DRY 9.0 WET 6.8 RELHU 74 WTRCLR SEA 7 DIR 35 SWELL 6 DIR 35
 CLOUD TYPE 5 AMT 7 VIS 7 WIRE ANGLE(S) 17

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.51	32.632	25.04	6.44	0.575	-0.026		105
1	5	10.51	32.637	25.04	6.44	0.575	-0.026		105
1	10	10.48	32.646	25.06	6.44	0.575	-0.025		105
1	19	10.49	32.641	25.05	6.56	0.586	-0.036		107
1	26	10.50	32.636	25.05	6.47	0.578	-0.028		105
1	43	10.51	32.635	25.04	6.53	0.583	-0.034		106
1	65	10.48	32.638	25.05	6.40	0.572	-0.022		104
1	87	8.98	33.087	25.65	5.05	0.451	0.116		80
1	108	8.39	33.407	25.99	4.43	0.396	0.178		69
1	130	8.18	33.782	26.31	3.52	0.314	0.261		55
1	153	7.92	33.887	26.43	3.17	0.283	0.295		49
1	173	7.70	33.936	26.50	2.91	0.260	0.321		45
1	260	6.08	33.950	26.74	2.70	0.241	0.363		40

BROWN BEAR CRUISE 318 STATION 070 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	0.40	0.32				32.630	0.82	2.7	5
7	0.57	0.85				32.624	0.82	2.4	4
24	0.42	1.02		1.25	100	32.633	0.76	2.3	4
				1.07	78				
				0.94	59				
				0.85	41				
				0.56	21				
				0.04	5				
51	0.44	1.00				32.659	0.81	2.4	4
200	0.00					33.930	2.09	30.3	41

23.29 47.26 - WATER COLUMN VALUES

MESSENGER TIME 1240 INCOMING SOLAR RADIATION - AM 141 PM 131

LIGHT SATURATION INCUBATOR ILLUMINATION 17700

BROWN BEAR			CRUISE 318			STATION 070			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.51	0.00	32.632	0.000	25.04	292.8	0.000	0.00	6.44	0.00			
10	10.48	0.00	32.646	0.000	25.06	291.5	0.030	0.02	6.44	0.00			
20	10.49	0.00	32.640	0.000	25.05	292.3	0.059	0.06	6.55	0.00	0.81		
30	10.50	0.00	32.635	0.000	25.04	293.1	0.089	0.14	6.47	0.02	0.97		
50	10.58	0.05	32.612	0.016	25.01	296.5	0.148	0.38	6.57	0.04	0.73		
75	9.83	0.10	32.822	0.023	25.30	269.3	0.219	0.83	5.82	0.08	0.65		
100	8.54	0.02	33.289	0.006	25.87	215.5	0.281	1.37	4.64	0.04	0.65		
150	7.95	0.00	33.883	0.005	26.43	163.7	0.376	2.57	3.20	0.01	0.85		
200	7.36	0.02	33.988	0.009	26.59	148.4	0.455	3.97	2.71	0.01	42.74		
250	6.37	0.01	33.949	0.005	26.70	138.8	0.527	5.64	2.66	0.01	28.58		

BROWN BEAR CRUISE 318 STATION 071 OBSERVED VALUES									
DATE 13/03/63 HR 00.2 LAT 44-13 N LONG 126-35 W WEA 02 WIND VEL 12 DIR 36									
BAROM 28.8 TEMP DRY 8.8 WET 6.6 RELHU 74 WTRCLR SEA 2 DIR 36 SWELL 3 DIR 36									
CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 25.---									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	10.14	32.599	25.08	6.86	0.613	-0.058	111	111
2	5	10.17	32.592	25.07	6.66	0.595	-0.041	107	107
2	10	10.13	32.593	25.07	6.72	0.600	-0.046	108	108
2	20	10.10	32.591	25.08	6.57	0.587	-0.032	106	106
2	30	10.13	32.591	25.07	6.89	0.615	-0.061	111	111
2	48	10.11	32.588	25.07	6.59	0.589	-0.034	106	106
2	73	10.01	32.612	25.11	6.48	0.579	-0.023	104	104
2	97	8.65	33.122	25.72	5.17	0.462	0.110	81	81
2	122	7.74	33.431	26.10	4.68	0.418	0.164	72	72
2	145	7.77	33.707	26.31	3.99	0.356	0.224	61	61
2	170	7.54	33.804	26.42	3.52	0.314	0.269	54	54
1	186	7.28	33.848	26.49	3.57	0.319	0.268	54	54
1	279	6.13	33.920	26.71	2.82	0.252	0.351	42	42
1	472	4.71	34.034	26.96	1.26	0.113	0.512	18	18
1	711	4.32	34.289	27.21	0.28	0.025	0.604	4	4
1	952	3.60	34.400	27.37	0.24	0.021	0.619	3	3
1	1440	3.03	34.510	27.51	0.57	0.051	0.598	8	8
1	1735	2.15	34.572	27.64	1.14	0.102	0.562	15	15

DEPTH	BROWN BEAR		CRUISE 318		STATION 071		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.14	0.00	32.599	0.000	25.08	289.3	0.000	0.00	6.86	0.00		
10	10.13	0.00	32.593	0.000	25.07	289.8	0.030	0.02	6.72	0.00		
20	10.10	0.00	32.591	0.000	25.08	289.6	0.059	0.06	6.57	0.00		
30	10.13	0.00	32.591	0.000	25.07	290.3	0.088	0.14	6.89	0.00		
50	10.13	0.02	32.580	0.006	25.06	291.5	0.147	0.38	6.60	0.02	0.92	
75	9.91	0.02	32.649	0.009	25.15	283.4	0.219	0.84	6.38	0.03	0.88	
100	8.50	0.01	33.165	0.004	25.78	224.1	0.283	1.40	5.09	0.02	0.85	
150	7.74	0.00	33.736	0.005	26.34	171.7	0.383	2.65	3.86	0.01	0.79	
200	7.08	0.01	33.869	0.006	26.54	153.4	0.465	4.11	3.51	0.04	1.56	
250	6.44	0.01	33.915	0.011	26.66	142.3	0.539	5.83	3.15	0.06	1.51	
300	5.92	0.01	33.932	0.002	26.74	135.1	0.609	7.80	2.63	0.01	0.96	
400	5.11	0.01	33.989	0.005	26.88	122.1	0.739	12.43	1.80	0.03	0.76	
500	4.63	0.03	34.064	0.005	27.00	112.0	0.857	17.87	1.09	0.00	0.87	
600	4.43	0.08	34.172	0.011	27.10	102.6	0.965	23.98	0.61	0.00	0.67	
700	4.32	0.01	34.277	0.002	27.20	94.5	1.065	30.61	0.30	0.00	0.93	
800	4.06	0.02	34.341	0.004	27.28	87.6	1.157	37.69	0.20	0.03	0.64	
1000	3.54	0.03	34.414	0.002	27.39	77.8	1.324	53.09	0.24	0.00	0.95	
1200	3.31	0.10	34.466	0.006	27.45	72.7	1.477	70.30	0.33	0.01	0.89	
1500	2.92	0.02	34.521	0.002	27.53	66.1	1.688	99.51	0.66	0.00	0.97	

DATE 13/03/63

HR 02.7

BAROM 28.1

CLOUD TYPE 6

AMT 3

TEMP DRY 8.8

VIS 7

WET 6.1

RELHU 68

WIRE ANGLE(S) 17

BROWN BEAR

CRUISE 318

STATION 072

LONG 126-21 W

WTRCLR

WIND VEL 18 DIR 35

SEA 1 DIR 35 SWELL 2 DIR 35

WEA 03

SNDG 2880

SECDI

OBSERVED VALUES

BROWN BEAR

CRUISE 318

STATION 072

CHL-A

PRODUCTIVITY

LAB-I

DECK-I

DEPTH

SAL

0

8

26

45

100

0.73

0.86

0.87

0.95

0.01

32.735

32.732

32.732

32.725

33.612

39.14

-

WATER COLUMN VALUES

MESSENGER TIME 1905

INCOMING SOLAR RADIATION - AM 141 PM 131

DEPTH	BROWN BEAR		CRUISE 318		STATION 072		INTERPOLATED AND COMPUTED VALUES						
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.37	0.00	32.730	0.000	25.14	283.3	0.000	0.00	7.56	0.00			
10	10.36	0.00	32.735	0.000	25.15	283.0	0.029	0.02	7.15	0.00			
20	10.34	0.00	32.740	0.000	25.15	282.5	0.057	0.06	7.96	0.05	0.88		
30	10.40	0.00	32.718	0.004	25.13	285.2	0.096	0.13	9.43	0.08	0.97		
50	10.28	0.02	32.737	0.021	25.16	282.3	0.143	0.37	6.73	0.02	0.87		
75	9.35	0.00	33.367	0.004	25.81	221.3	0.207	0.76	5.92	0.09	0.80		
100	8.82	0.03	33.641	0.002	26.10	193.5	0.259	1.23	5.38	0.17	0.76		
150	7.74	0.02	33.840	0.000	26.42	163.9	0.349	2.37	3.94	0.06	0.74		
200	7.45	0.01	33.976	0.000	26.57	150.6	0.428	3.78	3.77	0.19	10.81		
250	7.17	0.04	34.040	0.002	26.66	142.7	0.502	5.49	3.24	0.21	54.99		

BROWN BEAR CRUISE 318 STATION 073 OBSERVED VALUES												
DATE 13/03/63		HR 04.9	LAT 44-14 N	LONG 126-07 W	SNDG 2880	WEA 02	WIND VEL 15 DIR 35					
BAROM 28.1		TEMP DRY 8.8	WET 6.7	RELHU 75	WTRCLR	SEA 3	DIR 35	SWELL 3	DIR 35			
CLOUD TYPE 8		AMT 6	VIS 7	WIRE ANGLE(S) 13.0								
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NIR	SIL
2	0	10.25	32.507	24.99	8.87	0.792	-0.239		143	0.74	3.3	8
2	5	10.23	32.530	25.01	7.67	0.685	-0.132		124	0.79	3.6	9
2	10	10.21	32.532	25.01	11.25	1.005	-0.451		181	0.80	2.7	7
2	20	10.17	32.533	25.02	11.07	0.989	-0.435		179	0.82	3.9	9
2	30	10.30	32.596	25.05	5.83	0.521	0.032		94	0.76	3.3	8
2	49	10.36	32.627	25.06	7.48	0.668	-0.117		121	0.80	3.7	8
2	74	9.26	33.291	25.76	5.16	0.461	0.102		82	1.55	19.8	23
2	99	9.01	33.621	26.06	5.54	0.495	0.070		88	1.86	25.6	29
2	124	8.82	33.652	26.11	3.61	0.322	0.245		57	2.02	28.3	32
2	148	8.37	33.864	26.35	4.68	0.418	0.154		73	2.07	31.1	36
2	174	8.13	33.935	26.44	3.10	0.277	0.298		48	2.14	32.4	39
1	189	7.85	33.953	26.50	3.01	0.269	0.310		46	2.02	28.3	29
1	284	6.51	34.012	26.73	2.38	0.213	0.385		36	2.40	37.1	60
1	477	5.10	34.132	27.00	0.92	0.082	0.536		13	2.91	43.9	90
1	719	4.32	34.307	27.22	0.28	0.025	0.604		4	2.92	46.1	116
1	964	3.52	34.425	27.40	0.36	0.032	0.609		5	2.92	44.9	137
1	1454	2.64	34.525	27.56	0.57	0.051	0.605		8	2.92	43.5	133
1	1751	2.15	34.580	27.65	1.19	0.106	0.559		16	2.79	42.4	170

DEPTH	BROWN BEAR		CRUISE 318		STATION 073		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	10.25	0.00	32.507	0.000	24.99	297.9	0.000	0.00	8.87	0.00	1.50 1.56			
10	10.21	0.00	32.532	0.000	25.01	295.6	0.030	0.02	6.84	0.06				
20	10.17	0.00	32.533	0.000	25.02	295.0	0.060	0.06	5.88	0.10				
30	10.30	0.00	32.596	0.000	25.05	292.7	0.090	0.14	5.83	0.00				
50	10.32	0.01	32.650	0.007	25.09	289.4	0.148	0.38	7.41	0.05	0.95 0.94 0.94 0.90			
75	9.24	0.01	33.310	0.000	25.78	223.9	0.213	0.78	5.17	0.03				
100	9.00	0.00	33.623	0.003	26.06	197.6	0.266	1.26	5.46	0.03				
150	8.35	0.01	33.873	0.001	26.36	170.2	0.359	2.43	4.58	0.06				
200	7.66	0.01	33.962	0.002	26.53	154.6	0.441	3.89	2.94	0.00	1.51 1.85 0.97 0.76			
250	6.92	0.01	33.996	0.004	26.66	142.6	0.516	5.61	2.61	0.00				
300	6.35	0.01	34.022	0.000	26.76	133.8	0.585	7.58	2.25	0.01				
400	5.52	0.04	34.083	0.001	26.91	120.0	0.713	12.15	1.47	0.04				
500	5.00	0.02	34.149	0.001	27.02	110.0	0.829	17.49	0.82	0.01	0.89 0.67 0.89 0.67			
600	4.64	0.05	34.223	0.004	27.12	101.2	0.936	23.50	0.47	0.03				
700	4.36	0.01	34.294	0.001	27.21	93.7	1.034	30.06	0.29	0.01				
800	4.04	0.01	34.352	0.001	27.29	86.5	1.126	37.07	0.27	0.03				
1000	3.44	0.01	34.436	0.002	27.42	75.0	1.289	52.09	0.36	0.01	0.96 0.89 11.60			
1200	3.03	0.04	34.485	0.007	27.49	68.0	1.434	68.42	0.39	0.04				
1500	2.57	0.00	34.532	0.001	27.57	61.1	1.630	95.59	0.63	0.00				

BROWN BEAR CRUISE 318 STATION 074 OBSERVED VALUES
 DATE 13/03/63 HR 07.5 LAT 44-15 N LONG 125-54 W WEA 02 WIND VEL 12 DIR 36
 BAROM 27.1 TEMP DRY 8.4 WET 6.2 RELHU 73 WTRCLR SECDI 2907 SEA 3 DIR 36 SWELL 3 DIR 35
 CLOUD TYPE 1 AMT 7 VIS 7 WIRE ANGLE(S) 3

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	10.39	32.764	25.16	6.51	0.581	-0.031	106
1	5	10.43	32.767	25.16	6.55	0.585	-0.035	106
1	10	10.42	32.762	25.16	6.53	0.583	-0.033	106
1	20	10.39	32.746	25.15	6.55	0.585	-0.034	106
1	30	10.45	32.775	25.16	6.51	0.581	-0.032	106
1	49	10.43	32.788	25.18	6.50	0.581	-0.031	106
1	74	9.84	33.246	25.63	5.35	0.478	0.078	86
1	99	9.60	33.449	25.83	4.49	0.401	0.157	72
1	124	9.07	33.668	26.09	3.56	0.318	0.246	56
1	148	8.67	33.801	26.25	3.06	0.273	0.295	48
1	173	8.36	33.868	26.35	2.78	0.248	0.324	43
1	198	8.19	33.921	26.42	2.62	0.234	0.340	41
1	295	7.14	34.037	26.66	2.03	0.181	0.407	31

BROWN BEAR CRUISE 318 STATION 074 BIOLOGICAL DATA
 INCOMING SOLAR RADIATION - AM 128 PM 118
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 2351-0001 DEPTHS 100, 70
 0042-0052 35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 074		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.39	0.00	32.764	0.000	25.16	281.1	0.000	0.00	6.51	0.00		
10	10.42	0.00	32.762	0.000	25.16	281.9	0.029	0.02	6.53	0.00		
20	10.39	0.00	32.746	0.000	25.15	282.8	0.057	0.06	6.55	0.00		
30	10.45	0.00	32.775	0.000	25.16	281.9	0.086	0.13	6.51	0.00		
50	10.41	0.01	32.804	0.005	25.19	279.5	0.142	0.36	6.46	0.01	0.95	
75	9.83	0.00	33.256	0.002	25.64	237.2	0.207	0.77	5.31	0.00	0.94	
100	9.58	0.00	33.458	0.001	25.84	218.8	0.265	1.29	4.45	0.00	0.94	
150	8.64	0.00	33.808	0.001	26.26	179.4	0.365	2.55	3.03	0.00	0.89	
200	8.18	0.00	33.925	0.000	26.42	164.8	0.452	4.10	2.61	0.00	6.32	
250	7.88	0.02	33.996	0.000	26.52	156.0	0.533	5.96	2.41	0.01	61.35	

BROWN BEAR CRUISE 318 STATION 075 OBSERVED VALUES

DATE 13/03/63 HR 10.8 LAT 44-15 N LONG 125-40 W WEA 02 WIND VEL 18 DIR 34
 BAROM 26.1 TEMP DRY 7.8 WET 5.8 RELHU 75 WTRCLR SEA 5 DIR 35 SWELL 3 DIR 35
 CLOUD TYPE 2 AMT 7 VIS 6 WIRE ANGLE(S) 5, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
2	0	10.47	32.974	25.31	6.41	0.573	-0.024	104	
2	5	10.47	32.971	25.31	6.46	0.577	-0.028	105	
2	10	10.45	32.971	25.31	6.37	0.569	-0.020	104	
2	19	10.45	32.971	25.31	6.60	0.589	-0.040	107	
2	29	10.48	32.961	25.30	6.43	0.574	-0.026	105	
2	47	10.36	33.162	25.48	5.66	0.506	0.044	92	
2	72	10.00	33.346	25.68	5.21	0.465	0.088	84	
2	95	9.48	33.562	25.94	4.17	0.372	0.186	67	
2	119	9.20	33.674	26.07	3.64	0.325	0.237	58	
2	142	9.06	33.748	26.15	3.24	0.289	0.274	51	
2	167	9.03	33.793	26.19	3.04	0.272	0.292	48	
1	196	8.94	33.816	26.22	2.95	0.263	0.301	47	
1	292	8.14	33.957	26.46	2.50	0.223	0.351	39	
1	490	5.57	34.092	26.91	1.17	0.104	0.506	17	
1	734	4.36	34.266	27.19	0.37	0.033	0.596	5	
1	981	3.74	34.418	27.37	0.35	0.031	0.607	5	
1	1475	2.67	34.540	27.57	0.81	0.072	0.583	11	
1	1769	2.25	34.601	27.65	1.14	0.102	0.560	15	

BROWN BEAR CRUISE 318 STATION 075 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.02			32.959
8	0.86			32.959
26	0.91			32.959

40.74 - WATER COLUMN VALUES

MESSENGER TIME 0345 INCOMING SOLAR RADIATION - AM 128 PM 118

BROWN BEAR CRUISE 318 STATION 075				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.47	0.00	32.974	0.000	25.31	266.9	0.000	0.00	6.41	0.00	
10	10.45	0.00	32.971	0.000	25.31	267.0	0.027	0.01	6.37	0.00	
20	10.45	0.00	32.968	0.001	25.31	267.4	0.054	0.06	6.60	0.00	0.88
30	10.48	0.00	32.969	0.003	25.31	268.0	0.081	0.13	6.39	0.01	0.97
50	10.33	0.00	33.186	0.003	25.50	249.9	0.133	0.34	5.61	0.03	0.88
75	9.93	0.01	33.376	0.003	25.72	229.9	0.194	0.72	5.08	0.02	0.83
100	9.40	0.00	33.592	0.002	25.97	206.2	0.249	1.21	4.03	0.01	0.77
150	9.05	0.01	33.766	0.000	26.17	188.7	0.348	2.48	3.16	0.00	0.69
200	8.92	0.00	33.821	0.001	26.23	183.5	0.442	4.16	2.93	0.00	1.04
250	8.56	0.02	33.892	0.006	26.34	173.7	0.532	6.24	2.72	0.00	1.02
300	8.03	0.02	33.964	0.001	26.48	161.4	0.617	8.62	2.45	0.01	0.98
400	6.73	0.11	34.043	0.009	26.72	138.7	0.768	14.00	1.77	0.05	0.78
500	5.49	0.01	34.099	0.000	26.93	119.7	0.898	19.99	1.12	0.00	0.95
600	4.85	0.06	34.171	0.001	27.06	107.7	1.013	26.45	0.70	0.01	0.68
700	4.45	0.03	34.242	0.001	27.16	98.5	1.117	33.39	0.43	0.00	0.82
800	4.16	0.02	34.311	0.001	27.24	91.0	1.213	40.77	0.32	0.02	0.71
1000	3.69	0.00	34.425	0.001	27.38	78.7	1.385	56.55	0.36	0.00	0.98
1200	3.22	0.01	34.489	0.009	27.48	70.1	1.536	73.53	0.51	0.02	0.89
1500	2.63	0.00	34.544	0.001	27.58	60.9	1.735	101.02	0.84	0.00	0.99

BROWN BEAR CRUISE 318 STATION 076 OBSERVED VALUES
 DATE 13/03/63 HR 14.4 LAT 44-14 N LONG 125-27 W WEA WIND VEL 10 DIR 14
 BAROM 23.7 TEMP DRY 8.8 WET 5.8 RELHU 64 WTRCLR SEA 1 DIR 33 SWELL 1 DIR 33
 CLOUD TYPE 6 AMT 2 VIS 8 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
					HL/L	MGA/L		
1	0	10.39	32.810	25.20	6.54	0.584	-0.034	106
1	5	10.43	32.808	25.19	6.55	0.585	-0.035	106
1	10	10.41	32.814	25.20	6.57	0.587	-0.037	107
1	20	10.38	32.816	25.21	6.55	0.585	-0.035	106
1	30	10.41	32.809	25.20	6.46	0.577	-0.027	105
1	49	10.39	32.832	25.22	6.38	0.570	-0.020	104
1	74	10.09	33.176	25.53	5.61	0.501	0.052	91
1	99	9.41	33.447	25.86	4.57	0.408	0.152	73
1	124	9.21	33.658	26.06	3.67	0.328	0.234	58
1	148	9.06	33.744	26.15	3.32	0.297	0.267	53
1	174	8.75	33.816	26.25	3.05	0.272	0.295	48
1	198	8.44	33.892	26.36	2.74	0.245	0.326	43
1	296	7.14	33.998	26.63	2.69	0.240	0.348	41

BROWN BEAR CRUISE 318 STATION 076 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY SAL
 LAB-1 DECK-1
 0 1.28 16.72 32.804
 MESSENGER TIME 0612 INCOMING SOLAR RADIATION - AM 128 PM 118

DEPTH	BROWN BEAR		CRUISE 318		STATION 076		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	10.39	0.00	32.810	0.000	25.20	277.7	0.000	0.00	6.54	0.00			
10	10.41	0.00	32.814	0.000	25.20	277.9	0.028	0.01	6.57	0.00			
20	10.38	0.00	32.816	0.000	25.21	277.5	0.056	0.06	6.55	0.00			
30	10.41	0.00	32.809	0.000	25.20	278.7	0.084	0.13	6.46	0.00			
50	10.38	0.00	32.843	0.003	25.23	276.2	0.140	0.36	6.36	0.00	0.95		
75	10.06	0.01	33.188	0.000	25.55	245.9	0.206	0.78	5.57	0.00	0.94		
100	9.40	0.00	33.457	0.000	25.87	215.9	0.264	1.29	4.53	0.00	0.94		
150	9.04	0.00	33.750	0.000	26.15	189.7	0.366	2.59	3.30	0.00	0.90		
200	8.41	0.00	33.898	0.000	26.37	170.2	0.457	4.21	2.71	0.00	5.80		
250	7.74	0.01	33.974	0.010	26.53	155.5	0.539	6.10	2.56	0.06	61.30		

BROWN BEAR CRUISE 318 STATION 077 OBSERVED VALUES

DATE 13/03/63 HR 16.6 LAT 44-14 N LONG 125-13 W SNRG 2469 WEA 02 WIND VEL 7 DIR 34
 BAROM 22.7 TEMP DRY 8.3 WET 5.8 RELHU 69 WTRCLR SECDI SEA 1 DIR 34 SWELL 2 DIR 34
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 15, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MG/L	AOU	SATN	PHOS	NITR	SIL
2	0	10.43	32.759	25.15	6.58	0.588	-0.038	107	0.87	5.0	9	
2	5	10.45	32.756	25.15	7.56	0.675	-0.125	123	0.90	5.1	8	
2	10	10.42	32.748	25.15	9.98	0.891	-0.342	162	0.86	5.1	8	
2	20	10.40	32.748	25.15	8.97	0.801	-0.251	146	0.88	5.1	8	
2	29	10.45	32.761	25.15	8.93	0.798	-0.248	145	0.86	4.8	9	
2	47	10.29	32.824	25.23	6.96	0.622	-0.070	113	1.05	8.0	11	
2	72	9.92	33.108	25.51	6.55	0.585	-0.030	105	1.33	14.6	17	
2	95	9.35	33.482	25.90	6.82	0.609	-0.048	109	1.52	12.2	16	
2	119	8.99	33.686	26.11	3.94	0.352	0.213	62	2.02	26.4	33	
2	143	8.86	33.745	26.18	3.64	0.325	0.241	57	2.06	29.1	35	
2	167	8.74	33.789	26.23	4.22	0.377	0.191	66	1.98	21.3	27	
1	191	8.69	33.808	26.25	3.36	0.300	0.268	53	2.13	30.3	37	
1	285	6.98	33.999	26.65	2.24	0.200	0.391	34	2.36	35.5	56	
1	474	5.16	34.118	26.98	0.92	0.082	0.535	13	2.72	41.8	87	
1	715	4.42	34.360	27.25	0.32	0.029	0.599	5	2.89	44.1	106	
1	956	3.75	34.412	27.37	0.33	0.029	0.608	5	2.93	44.6	125	
1	1438	2.70	34.537	27.56	0.85	0.076	0.579	12	2.87	44.7	139	
1	1726	2.28	34.607	27.66	1.25	0.112	0.550	17	2.78	44.2	153	

DEPTH	BROWN BEAR		CRUISE 318		STATION 077		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0 10 20 30	10.43	0.00	32.759	0.000	25.15	282.1	0.000	0.00	6.58	0.00	0.98		
	10.42	0.00	32.748	0.000	25.15	283.0	0.029	0.02	9.98	0.00			
	10.40	0.00	32.748	0.000	25.15	282.8	0.057	0.06	8.97	0.00			
	10.45	0.00	32.762	0.001	25.15	282.8	0.086	0.13	8.84	0.03			
50 75 100 150	10.26	0.00	32.849	0.002	25.25	273.7	0.142	0.36	6.82	0.03	0.88		
	9.85	0.01	33.159	0.005	25.56	244.6	0.207	0.78	6.65	0.07			
	9.26	0.00	33.538	0.001	25.95	207.8	0.264	1.28	6.25	0.16			
	8.82	0.00	33.760	0.000	26.20	185.6	0.363	2.54	3.84	0.08			
200 250 300 400	8.57	0.04	33.824	0.004	26.29	177.9	0.455	4.18	3.17	0.05	1.15		
	7.73	0.11	33.922	0.011	26.49	159.2	0.540	6.14	2.43	0.13			
	6.78	0.01	34.014	0.005	26.69	140.0	0.615	8.25	2.10	0.01			
	5.68	0.04	34.089	0.017	26.89	121.6	0.747	12.96	1.32	0.02			
500 600 700 800	5.04	0.03	34.146	0.005	27.02	110.6	0.865	18.35	0.81	0.01	0.88		
	4.66	0.07	34.250	0.012	27.14	99.4	0.971	24.32	0.49	0.03			
	4.44	0.02	34.346	0.003	27.24	90.7	1.067	30.72	0.33	0.01			
	4.17	0.00	34.389	0.007	27.30	85.3	1.156	37.57	0.28	0.02			
1000 1200 1500	3.64	0.00	34.423	0.001	27.39	78.2	1.321	52.83	0.36	0.01	0.96		
	3.17	0.00	34.474	0.002	27.47	70.4	1.472	69.80	0.54	0.02			
	2.60	0.00	34.553	0.000	27.59	59.8	1.670	97.11	0.94	0.00			

BROWN BEAR CRUISE 318 STATION 078 OBSERVED VALUES
 DATE 13/03/63 HR 20.1 LAT 44-14 N LONG 124-59 W SMDG 613 WEA 02 WIND VEL 4 DIR 34
 BAROM 22.0 TEMP DRY 8.8 WET 6.3 RELHU 70 WTRCLR SECDI 8 SEA 0 DIR 34 SWELL 1 DIR 34
 CLOUD TYPE 6 AMT 7 VIS 7 WIRE ANGLE(S) --
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN
 1 0 10.15 32.073 24.67 8.17 0.730 -0.173 131
 1 5 10.18 32.076 24.66 7.50 0.670 -0.114 121
 1 10 10.07 32.086 24.69 7.91 0.706 -0.149 127
 1 20 10.09 32.352 24.89 7.17 0.640 -0.085 115
 1 30 10.16 32.608 25.08 6.97 0.623 -0.069 112
 1 49 10.14 32.638 25.11 6.72 0.600 -0.046 108
 1 74 9.95 33.212 25.59 5.88 0.525 0.029 95
 1 99 9.28 33.445 25.88 4.45 0.397 0.164 71
 1 124 8.90 33.747 26.17 3.68 0.329 0.237 59
 1 148 8.52 33.833 26.30 2.98 0.266 0.304 47
 1 174 8.06 33.936 26.45 2.95 0.263 0.312 46
 1 198 7.56 33.974 26.55 2.48 0.221 0.361 38
 1 296 5.88 34.111 26.89 1.33 0.119 0.487 20
 1 395 5.58 34.135 26.94 1.05 0.094 0.517 15

BROWN BEAR CRUISE 318 STATION 078 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IPRAD	SAL	PHOS	NITR	SIL
0	2.59	14.82	76.18				32.080	0.60	1.0	6
2	2.54	13.57	52.06			50	32.068	0.62	1.2	5
9	2.08	4.75	3.02			10	32.305	0.67	1.5	5
24	1.02	2.14	0.00	1.99	100	1	32.532	0.80	3.2	8
				1.82	78					
				1.51	59					
				1.66	41					
				1.12	21					
				0.16	5					
100	0.08	0.00					33.571	1.56	16.8	20
150	0.04						33.805	1.86	16.2	22
200	0.05						33.943	2.17	26.2	35

44.60 144.21 365.68 - WATER COLUMN VALUES

MESSANGER TIME 1143 INCOMING SOLAR RADIATION - AM 128 PM 118
LIGHT SATURATION INCUBATOR ILLUMINATION 18000

BROWN BEAR				CRUISE 318				STATION 078				INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(D)	VAR RATIO							
0	10.15	0.00	32.073	0.000	24.67	328.4	0.000	0.00	8.17	0.00								
10	10.07	0.00	32.086	0.000	24.69	326.4	0.033	0.02	7.91	0.00								
20	10.09	0.00	32.352	0.000	24.89	307.2	0.065	0.07	7.17	0.00								
30	10.16	0.00	32.608	0.000	25.08	289.5	0.095	0.14	6.97	0.00								
50	10.14	0.00	32.658	0.006	25.12	285.8	0.153	0.38	6.70	0.00	0.95							
75	9.93	0.00	33.224	0.003	25.60	241.1	0.220	0.80	5.82	0.01	0.94							
100	9.26	0.00	33.458	0.002	25.89	213.8	0.277	1.31	4.41	0.00	0.94							
150	8.49	0.00	33.842	0.001	26.31	174.6	0.375	2.54	2.97	0.01	0.90							
200	7.52	0.00	33.978	0.000	26.56	151.4	0.457	4.00	2.45	0.00	1.03							
250	6.55	0.03	34.056	0.003	26.76	133.2	0.529	5.65	1.74	0.02	1.32							
300	5.83	0.00	34.115	0.001	26.90	120.4	0.593	7.45	1.30	0.00	1.08							

BROWN BEAR CRUISE 318 STATION 079 OBSERVED VALUES

DATE 13/03/63 HK 21.9 LAT 44-14 N LONG 124-45 W SNDG 101 WEA 02 WIND VEL 4 DIR 32
 BAROM 19.3 TEMP 0RY 8.6 WET 5.8 RELHU 67 WTRCLR SECDI SEA 3 DIR 34 SWELL 3 DIR 34
 CLOUD TYPE 7 AMT 8 VIS 9 WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.99	32.222	24.81	6.68	0.597	-0.039	107	0.79	0.79	6.5	10
1	5	10.02	32.236	24.82	6.97	0.623	-0.065	112	0.87	0.87	5.9	10
1	10	9.90	32.286	24.87	9.31	0.832	-0.273	149	0.88	0.88	6.2	10
1	20	9.89	32.291	24.88	8.06	0.720	-0.161	129	0.90	0.90	6.2	11
1	30	9.99	32.434	24.97	6.76	0.604	-0.047	108	0.94	0.94	7.5	11
1	49	9.92	32.903	25.35	5.90	0.527	0.029	95	1.23	1.23	13.5	16
1	73	9.34	33.288	25.75	4.79	0.428	0.134	76	1.53	1.53	17.1	20
1	98	8.26	33.824	26.33	3.02	0.270	0.304	47	2.23	2.23	31.3	40

BROWN BEAR			CRUISE 318			STATION 079			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VGL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.99	0.00	32.222	0.000	24.81	314.8	0.060	0.00	6.68	0.00			
10	9.90	0.00	32.286	0.000	24.87	308.9	0.032	0.02	9.31	0.00			
20	9.89	0.00	32.291	0.000	24.88	308.5	0.063	0.06	8.06	0.00			
30	9.99	0.00	32.434	0.000	24.97	299.7	0.094	0.14	6.76	0.00			
50	9.91	0.00	32.920	0.002	25.37	262.8	0.150	0.37	5.86	0.00	0.95		
75	9.27	0.00	33.320	0.004	25.78	223.7	0.212	0.76	4.68	0.01	1.10		

BROWN BEAR										CRUISE 318			STATION 080			OBSERVED VALUES				
DATE 14/03/63		HR 00.4		LAT 44-14 N		LONG 124-33 W		SNDG 104		WEA 01		WIND VEL 18		DIR 22						
BAROM 17.9		TEMP DRY 7.2		WET 5.8		RELHU 82		WTRCLR		SECDI 7		SEA 1		DIR 27						
CLOUD TYPE 6		AMT 7		VIS 7		WIRE ANGLE(S) 0						SWELL 1		DIR 30						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN											
2	0	9.85	32.703	25.21	6.15	0.549	0.008		99											
2	5	9.82	32.708	25.22	6.11	0.546	0.012		98											
2	15	9.69	32.710	25.24	6.05	0.540	0.019		97											
2	25	9.75	32.766	25.27	6.17	0.551	0.007		99											
2	44	9.45	33.159	25.63	5.02	0.448	0.112		80											
2	69	9.16	33.421	25.88	4.27	0.381	0.182		68											
2	89	8.13	33.796	26.33	2.82	0.252	0.324		44											

WIND VEL 18 DIR 22
SEA 1 DIR 27 SWELL 1 DIR 30

BROWN BEAR CRUISE 318 STATION 080 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.04			32.690
2	1.28			32.668
9	1.55			32.679
24	1.63			32.744
94	0.29			33.787

103.58 - WATER COLUMN VALUES

MESSANGER TIME 1620 INCOMING SOLAR RADIATION - AM 128 PM 118

BROWN BEAR			CRUISE 318			STATION 080		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPO1 ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.85	0.00	32.703	0.000	25.21	277.0	0.000	0.00	6.15	0.00		
10	9.75	0.01	32.706	0.003	25.23	275.4	0.028	0.01	6.07	0.01	0.80	
20	9.72	0.01	32.728	0.002	25.25	273.4	0.056	0.06	6.13	0.03	0.60	
30	9.69	0.02	32.859	0.018	25.35	263.5	0.083	0.13	5.93	0.07	0.86	
50	9.43	0.04	33.225	0.016	25.68	232.7	0.133	0.33	4.85	0.06	0.79	
75	8.97	0.03	33.501	0.011	25.97	205.6	0.188	0.68	3.98	0.04	1.04	

BROWN BEAR CRUISE 318 STATION 081 OBSERVED VALUES
 DATE 14/03/63 HR 02.9 LAT 44-14 N LONG 124-18 W SNRG 73 WEA 25 WIND VEL 14 DIR 18
 BAROM 15.2 TEMP DRY 8.5 WET 6.7 RELHU 77 WTRCLR SECDI SEA 1 DIR 22 SWELL 1 DIR 22
 CLOUD TYPE 6 AMT 8 VIS 7 WIRE ANGLE(S) ---
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN ADU SATM PHOS NITR SIL
 1 0 9.96 32.710 25.19 6.93 0.619 -0.063 111 1.04 8.5 11
 1 5 9.99 32.689 25.17 6.91 0.617 -0.061 111 1.06 8.6 11
 1 10 9.92 32.700 25.19 6.75 0.603 -0.046 108 1.06 9.4 12
 1 20 9.76 32.770 25.27 6.18 0.552 0.006 99 1.25 13.0 15
 1 30 9.65 33.050 25.51 5.35 0.478 0.081 86 1.54 17.6 22
 1 49 9.26 33.488 25.91 4.15 0.371 0.191 66 1.96 23.8 30
 1 64 8.72 33.666 26.14 3.11 0.278 0.290 49 2.25 28.7 38

BROWN BEAR CRUISE 318 STATION 081 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL ANOMALY GEOPT ANOMALY POT ENERGY OXY ML/L E(O) VAR RATIO
 0 9.96 0.00 32.710 0.000 25.19 278.2 0.000 0.00 0.00 6.93 0.00
 10 9.92 0.00 32.700 0.000 25.19 278.5 0.029 0.01 0.00 6.75 0.00
 20 9.76 0.00 32.770 0.000 25.27 271.0 0.056 0.06 0.00 6.18 0.00
 30 9.65 0.00 33.050 0.000 25.51 248.7 0.082 0.12 0.00 5.35 0.00
 50 9.23 0.00 33.505 0.001 25.93 208.9 0.128 0.31 0.00 4.09 1.04

BROWN BEAR CRUISE 318 STATION 082 OBSERVED VALUES

CUMMINS PEAK

DATE 14/03/63 HR 04.2 LAT 44-15 N LONG 124-03 W SNOG 37 WEA 02 WIND VEL 28 DIR 16
 BAROM 14.2 TEMP DRY 7.8 WET 6.7 REL HU 86 WTR CLR SECDI SEA 1 DIR 16 SWELL 1 DIR 16
 CLOUD TYPE 8 AMT 7 VIS 8 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.24	32.642	25.09	9.38	0.838	-0.285	152	0.82	3.7	6	
1	5	10.27	32.645	25.09	8.74	0.781	-0.228	141	0.80	4.2	6	
1	10	10.15	32.674	25.13	7.74	0.691	-0.137	125	0.94	5.3	7	
1	20	9.95	32.933	25.37	6.16	0.550	0.005	99	1.44	14.9	18	
1	30	9.83	33.213	25.61	5.27	0.471	0.085	85	1.76	19.8	25	

BROWN BEAR CRUISE 318 STATION 082 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	6.32				32.617
2	7.30				32.620
9	6.37				32.625
24	0.74				32.926

114.73 - WATER COLUMN VALUES

MESSANGER TIME 2040 INCOMING SOLAR RADIATION - AM 128 PM 118

BROWN BEAR		CRUISE 318		STATION 082		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.24	0.00	32.642	0.000	25.09	287.7	0.000	0.00	9.36	0.00	
10	10.15	0.00	32.674	0.000	25.13	284.1	0.029	0.02	7.74	0.00	
20	9.95	0.00	32.933	0.000	25.37	261.9	0.057	0.06	6.16	0.00	
30	9.83	0.00	33.213	0.000	25.61	239.5	0.082	0.12	5.27	0.00	

BROWN BEAR			CRUISE 318			STATION 083			OBSERVED VALUES					
SAND LAKE														
DATE 14/03/63			HR 12.6	LAT 45-14 N	LONG 124-01 W	SNRG 42	WEA 00	WIND VEL 14	DIR 32					
BAROM 06.0			TEMP DRY 7.6	WET 5.4	RELHU 73	WTRCLR	SECDI	SEA 2	DIR 30	SWELL 1	DIR 30			
CLOUD TYPE 6			AMT 5	VIS 7	WIRE ANGLE(S) 10									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN AOU	PHOS	NITR	SIL				
1	0	9.42	31.314	24.19	6.57	0.587	-0.018	0.93	7.6	15				
1	5	9.37	31.459	24.31	6.45	0.576	-0.008	0.90	5.1	11				
1	15	9.31	32.415	25.07	5.92	0.529	0.037	1.52	15.2	23				
1	25	9.22	32.930	25.49	5.23	0.467	0.098	1.77	19.7	27				
1	30	9.01	33.206	25.73	4.35	0.389	0.178	1.95	23.2	32				

BIOLOGICAL DATA

STATION 083

CRUISE 318

BROWN BEAR

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	2.19	1.36	31.317
2	2.28	1.15	31.345
9	1.94		31.409
24	0.80	1.41	32.860

39.76 30.67 WATER COLUMN VALUES

MESSENGER TIME 0445

INTERPOLATED AND COMPUTED VALUES

STATION 083

CRUISE 318

BROWN BEAR

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.42	0.00	31.314	0.000	24.19	373.4	0.000	0.00	6.57	0.00	
10	9.34	0.00	31.909	0.055	24.67	328.2	0.036	0.02	6.22	0.01	0.80
20	9.29	0.02	32.697	0.020	25.29	269.2	0.066	0.06	5.67	0.05	0.80
30	9.01	0.00	33.206	0.000	25.73	227.4	0.091	0.13	4.35	0.00	

BROWN BEAR CRUISE 318 STATION 33A BIOLOGICAL DATA

DATE 14/03/63 LAT 45-14 N LONG 125-10 W

DEPTH CHL-A PRODUCTIVITY SAL
LAB-I DECK-I

0 8.12 56.36 30.749

MESSENGER TIME 0615

BROWN BEAR CRUISE 318 STATION 084 OBSERVED VALUES

DATE 14/03/63 HR 15.2 LAT 45-14 N LONG 124-16 W SNOG 177 MEA 01 WIND VEL 8 DIR 32
BAROM 07.1 TEMP DRY 7.8 WET 5.6 RELHU 73 WTRCLR SECDI 6 SEA 1 DIR 27 SWELL 1 DIR 27
CLOUD TYPE 9 AMT 4 VIS 8 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.60	30.030	23.17	6.77	0.605	-0.033	106	0.73	0.73	5.9	20
1	5	9.62	30.076	23.20	7.85	0.701	-0.130	123	0.82	0.82	6.1	20
1	10	9.61	30.492	23.52	7.39	0.660	-0.091	116	0.85	0.85	6.1	19
1	20	9.79	31.971	24.65	6.89	0.615	-0.054	110	0.94	0.94	6.2	12
1	29	9.98	32.449	24.99	6.29	0.562	-0.005	101	1.02	1.02	8.4	12
1	48	9.72	32.827	25.32	6.01	0.537	0.022	96	1.26	1.26	12.8	15
1	73	9.23	33.324	25.79	4.52	0.404	0.159	72	1.52	1.52	13.4	16
1	97	8.77	33.583	26.07	3.74	0.334	0.234	59	1.97	1.97	26.8	30
1	122	8.52	33.772	26.25	3.28	0.293	0.277	51	2.11	2.11	28.7	35
1	145	7.96	33.871	26.41	2.82	0.252	0.326	44	2.22	2.22	32.5	41
1	159	7.14	33.975	26.61	2.38	0.213	0.376	36	2.41	2.41	34.4	48

BROWN BEAR				STATION 084				INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.60	0.00	30.030	0.000	23.17	471.5	0.000	0.00	6.77	0.00			
10	9.61	0.00	30.492	0.000	23.52	437.5	0.046	0.02	7.39	0.00			
20	9.79	0.00	31.971	0.000	24.65	330.7	0.085	0.08	6.89	0.00			
30	9.98	0.01	32.480	0.007	25.01	296.1	0.117	0.16	6.27	0.02	0.98		
50	9.68	0.00	32.871	0.003	25.26	262.9	0.173	0.39	5.90	0.02	0.91		
75	9.19	0.00	33.351	0.002	25.82	220.1	0.234	0.77	4.44	0.00	0.88		
100	8.74	0.01	33.610	0.000	26.09	194.7	0.286	1.24	3.68	0.01	0.85		
150	7.72	0.01	33.901	0.002	26.47	159.1	0.375	2.36	2.68	0.00	0.81		

BROWN BEAR				STATION 085				OBSERVED VALUES					
DATE 14/03/63				HR 18.1				LAT 45-14 N				LONG 124-31 W	
BAROM 08.1				TEMP DRY 6.9				WET 4.7				RELHU 72	
CLOUD TYPE 8				AMT 5				VIS 8				WIRE ANGLE(S)	
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL	
1	0	9.46	28.650	22.11	8.14	0.727	-0.149	126	0.51	0.51	2.8	23	
1	5	9.50	28.714	22.16	7.67	0.685	-0.107	119	0.60	0.60	3.1	24	
1	10	9.64	29.548	22.78	8.54	0.763	-0.170	133	0.68	0.68	3.9	20	
1	20	9.92	32.454	25.00	9.19	0.821	-0.263	147	0.96	0.96	4.5	10	
1	30	10.01	32.531	25.05	6.82	0.609	-0.053	110	0.87	0.87	4.8	7	
1	49	9.81	32.724	25.23	6.10	0.545	0.013	98	1.17	1.17	10.0	13	
1	74	9.39	33.198	25.67	5.20	0.464	0.097	83	1.63	1.63	18.2	22	
1	99	8.77	33.584	26.07	3.98	0.355	0.212	63	1.99	1.99	25.1	31	
1	124	8.56	33.822	26.29	3.17	0.283	0.287	50	2.19	2.19	30.5	37	
1	148	8.25	33.885	26.38	2.99	0.267	0.307	47	2.25	2.25	31.7	40	
1	173	7.90	33.936	26.47	2.86	0.255	0.323	44	2.27	2.27	33.3	42	
1	198	7.53	33.959	26.55	2.51	0.224	0.359	38	2.27	2.27	33.8	44	
1	296	6.37	34.014	26.75	2.01	0.180	0.420	30	2.54	2.54	37.0	62	
1	347	5.94	34.042	26.83	1.85	0.165	0.440	27	2.69	2.69	40.0	71	
1	372	5.68	34.071	26.88	1.75	0.156	0.453	26	2.86	2.86	41.3	77	

BROWN BEAR CRUISE 318 STATION 085 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 318	STATION 085	LIGHT SAT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	3.27	14.30	78.80		16.48	100	28.648	0.52	2.3	23
					15.31	78				
					12.89	59				
					8.02	41				
					5.30	21				
					0.43	5				
2	3.34	16.18	58.20				28.668	0.59	2.7	24
9	4.64	19.13	14.82				29.368	0.86	3.4	21
150	0.05						33.871	2.12	23.8	30
200	0.02						33.957	2.20	26.0	34

104.14 297.54 503.94 - WATER COLUMN VALUES

MESSENGER TIME 1130

LIGHT SATURATION INCUBATOR ILLUMINATION 18000

DEPTH	BROWN BEAR	CRUISE 318			STATION 085	INTERPOLATED AND COMPUTED VALUES						
		TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0		9.46	0.00	28.650	0.000	22.11	572.1	0.000	0.00	8.14	0.00	
10		9.64	0.00	29.548	0.000	22.78	508.1	0.055	0.03	8.54	0.00	
20		9.92	0.00	32.454	0.000	25.00	296.9	0.095	0.08	9.19	0.00	
30		10.01	0.00	32.531	0.000	25.05	292.8	0.125	0.16	6.82	0.00	
50		9.80	0.00	32.741	0.002	25.25	274.2	0.182	0.39	6.07	0.00	0.95
75		9.36	0.00	33.216	0.000	25.69	232.8	0.246	0.80	5.15	0.00	0.94
100		8.76	0.00	33.597	0.000	26.08	195.9	0.300	1.28	3.94	0.00	0.94
150		8.22	0.00	33.890	0.000	26.39	167.1	0.392	2.43	2.98	0.00	0.89
200		7.50	0.00	33.960	0.000	26.55	152.4	0.472	3.87	2.49	0.00	1.03
250		6.86	0.00	33.992	0.002	26.67	142.1	0.546	5.58	2.14	0.05	1.39
300		6.34	0.00	34.015	0.001	26.75	134.1	0.616	7.54	2.00	0.00	0.86

BROWN BEAR CRUISE 318 STATION 086 OBSERVED VALUES
 DATE 14/03/63 HR 22.2 LAT 45-14 N LONG 124-43 W SNGD 638 WEA 60 WIND VEL 20 DIR 32
 BAROM 08.5 TEMP DRY 6.3 WET 5.3 RELHU 86 WTRCLR SECDI 5 SEA 2 DIR 32 SWELL 3 DIR 28
 CLOUD TYPE 8 AMT 4 VIS 8 WIRE ANGLE(S) 16

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.65	28.990	22.35	7.45	0.665	-0.091		116
1	5	9.66	29.018	22.37	7.50	0.670	-0.095		117
1	10	9.68	30.410	23.45	7.43	0.664	-0.095		117
1	19	9.76	31.858	24.56	6.67	0.596	-0.034		106
1	28	9.91	32.490	25.03	6.53	0.583	-0.026		105
1	46	9.77	32.576	25.12	6.16	0.550	0.009		98
1	70	9.49	32.985	25.49	5.23	0.467	0.094		83
1	95	8.76	33.514	26.01	3.89	0.347	0.221		61
1	118	8.61	33.720	26.20	3.22	0.288	0.282		51
1	141	8.36	33.836	26.33	2.99	0.267	0.305		47
1	166	8.02	33.915	26.44	2.65	0.237	0.340		41
1	189	7.57	33.922	26.51	2.78	0.248	0.334		43
1	283	6.36	33.997	26.74	2.05	0.183	0.416		31
1	426	5.35	34.098	26.94	1.04	0.093	0.521		15

DEPTH	BROWN BEAR		CRUISE 318		STATION 086		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.65	0.00	28.990	0.000	22.35	549.6	0.000	0.00	7.45	0.00			
10	9.68	0.00	30.410	0.000	23.45	444.7	0.051	0.02	7.43	0.00			
20	9.78	0.00	31.958	0.007	24.64	331.5	0.090	0.08	6.64	0.01	0.86		
30	9.91	0.01	32.534	0.029	25.06	291.1	0.121	0.16	6.50	0.00	0.95		
50	9.74	0.01	32.629	0.006	25.17	281.7	0.179	0.40	6.03	0.00	0.84		
75	9.34	0.03	33.099	0.011	25.60	241.1	0.245	0.81	4.95	0.03	0.77		
100	8.71	0.02	33.574	0.005	26.07	196.8	0.300	1.30	3.70	0.00	0.74		
150	8.25	0.00	33.872	0.001	26.37	168.9	0.392	2.47	2.84	0.02	0.69		
200	7.39	0.01	33.929	0.001	26.54	153.2	0.47	3.92	2.75	0.04	1.19		
250	6.70	0.02	33.967	0.003	26.67	141.9	0.547	5.63	2.42	0.08	1.14		
300	6.22	0.02	34.014	0.003	26.77	132.7	0.617	7.58	1.82	0.07	1.85		
400	5.54	0.05	34.092	0.008	26.91	119.7	0.744	12.12	0.92	0.19	3.87		

BROWN BEAR CRUISE 318 STATION 087 OBSERVED VALUES

DATE 15/03/63 HR 00.6 LAT 45-14 N LONG 124-58 W SNOG 1015 WEA 03 WIND VEL 20 DIR 32
 BAROM 09.8 TEMP DRY 7.1 WET 5.4 RELHU 78 WTRCLR SEA 2 DIR 33 SWELL 1 DIR 33
 CLOUD TYPE 9 AMT 6 VIS 8 WIRE ANGLE(S) 18,---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
						MGA/L					
2	0	9.61	29.993	23.14	7.68	0.686	-0.115	120	0.42	0.4	14
2	5	9.64	29.994	23.13	7.40	0.661	-0.090	116	0.54	0.6	14
2	10	9.70	31.295	24.13	7.66	0.684	-0.119	121	0.77	1.2	10
2	20	9.86	31.987	24.65	6.88	0.614	-0.054	110	0.77	2.4	10
2	30	10.03	32.518	25.03	6.76	0.604	-0.048	109	0.82	3.6	9
2	49	9.93	32.925	25.37	5.72	0.511	0.045	92	0.97	12.1	15
2	74	9.37	33.359	25.80	4.59	0.410	0.151	73	1.82	20.8	24
2	99	8.86	33.656	26.11	3.68	0.329	0.238	58	2.14	26.7	33
2	124	8.61	33.771	26.24	3.21	0.287	0.283	50	2.18	29.6	35
2	149	8.11	33.885	26.40	2.80	0.250	0.325	43	2.27	28.9	40
2	175	7.75	33.958	26.51	2.55	0.228	0.352	39	2.37	33.1	43
1	191	7.64	33.966	26.54	2.51	0.224	0.357	39	2.37	33.3	42
1	283	6.51	34.000	26.72	2.01	0.180	0.418	30	2.45	33.3	57
1	472	5.30	34.086	26.94	0.97	0.087	0.528	14	2.82	39.4	83
1	710	4.40	34.296	27.21	0.31	0.028	0.600	4	3.05	42.0	111
1	949	3.70	34.406	27.37	0.34	0.030	0.608	5	2.94	44.3	123

BROWN BEAR CRUISE 318 STATION 087 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	6.14	8.71		30.103
2	6.60	20.72		29.955
9	6.35	19.86		30.854
24	4.18	9.07		31.976
100	0.06	0.22		33.577

137.04 388.44 - WATER COLUMN VALUES

MESSENGER TIME 1640

BROWN BEAR			CRUISE 318		STATION 087		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(D)	VAR RATIO
0	9.61	0.00	29.993	0.000	23.14	474.4	0.000	0.00	7.68	0.00	
10	9.70	0.00	31.295	0.000	24.13	379.2	0.043	0.02	7.66	0.00	
20	9.86	0.00	31.987	0.000	24.65	330.6	0.079	0.07	6.88	0.00	
30	10.03	0.00	32.518	0.000	25.03	294.1	0.111	0.15	6.76	0.00	
50	9.91	0.00	32.945	0.000	25.38	261.0	0.167	0.38	5.67	0.00	0.95
75	9.35	0.00	33.374	0.000	25.81	220.9	0.227	0.76	4.55	0.00	0.94
100	8.85	0.00	33.662	0.001	26.12	192.4	0.279	1.23	3.66	0.00	0.94
150	8.09	0.00	33.889	0.000	26.41	165.3	0.369	2.37	2.79	0.00	0.94
200	7.54	0.02	33.970	0.000	26.55	152.3	0.450	3.80	2.47	0.01	1.36
250	6.94	0.05	33.989	0.001	26.65	143.4	0.524	5.51	2.22	0.02	1.64
300	6.36	0.01	34.006	0.001	26.74	135.2	0.594	7.49	1.91	0.01	0.97
400	5.65	0.04	34.048	0.002	26.87	124.2	0.725	12.17	1.34	0.02	0.76
500	5.17	0.01	34.110	0.004	26.97	114.9	0.846	17.73	0.86	0.00	0.87
600	4.76	0.02	34.198	0.009	27.09	104.5	0.957	23.97	0.53	0.00	0.67
700	4.43	0.00	34.287	0.001	27.20	95.0	1.057	30.68	0.32	0.00	0.94
800	4.14	0.01	34.362	0.004	27.29	87.0	1.149	37.76	0.24	0.00	6.57

BROWN BEAR CRUISE 318 STATION 088 OBSERVED VALUES
 DATE 15/03/63 HR 04.5 LAT 45-13 N LONG 125-12 W SNOG 1572 WEA 03 WIND VEL 25 DIR 31
 BAROM 09.8 TEMP DRY 7.5 WET 5.8 RELHU 79 WTRCLR SECDI SEA 3 DIR 31 SWELL 1 DIR 31
 CLOUD TYPE 9 AMT 6 VIS 7 WIRE ANGLE(S) 43.37

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.52	30.101	23.23	7.89	0.705	-0.133		123
1	5	9.54	30.096	23.23	7.52	0.672	-0.100		117
2	8	9.56	30.250	23.34	7.64	0.682	-0.112		120
2	16	9.66	30.986	23.90	7.74	0.691	-0.125		122
2	24	9.87	31.442	24.22	7.35	0.656	-0.094		117
2	37	10.02	32.553	25.06	7.11	0.635	-0.079		114
2	56	9.99	32.936	25.36	6.18	0.552	0.003		99
2	77	9.62	33.301	25.71	5.33	0.476	0.082		85
2	97	8.95	33.532	26.00	4.15	0.371	0.195		66
2	115	8.48	33.694	26.20	3.51	0.313	0.258		55
2	136	7.98	33.815	26.37	3.11	0.278	0.300		48
2	154	7.66	33.867	26.46	3.15	0.281	0.300		48
2	231	6.77	33.976	26.67	3.29	0.294	0.300		49

BROWN BEAR CRUISE 318 STATION 088 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	4.37	10.50	30.104
2	4.69	10.10	30.025
9	5.29	15.43	30.890
100	0.08	0.00	33.480

123.34 225.68 - WATER COLUMN VALUES

MESSANGER TIME 2030

DEPTH	BROWN BEAR		CRUISE 318		STATION 088		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.52	0.00	30.101	0.000	23.23	465.1	0.000	0.00	7.89	0.00		
10	9.58	0.00	30.425	0.024	23.48	442.0	0.046	0.02	7.70	0.01	1.02	
20	9.76	0.01	31.221	0.019	24.07	385.9	0.088	0.09	7.56	0.03	0.60	
30	9.96	0.00	31.968	0.047	24.62	333.8	0.124	0.18	7.22	0.03	0.71	
50	10.04	0.00	32.892	0.069	25.32	267.1	0.185	0.42	6.57	0.03	0.74	
75	9.67	0.00	33.266	0.003	25.67	234.0	0.248	0.82	5.43	0.00	0.86	
100	8.87	0.00	33.562	0.000	26.04	200.0	0.302	1.31	4.02	0.00	0.79	
150	7.72	0.00	33.858	0.001	26.44	162.3	0.394	2.45	3.13	0.01	0.65	
200	7.11	0.02	33.908	0.015	26.57	150.8	0.473	3.86	3.06	0.12	60.06	

BROWN BEAR CRUISE 318 STATION 089 OBSERVED VALUES

DATE 15/03/63 HR 07.8 LAT 45-13 N LONG 125-26 W SNRG 2560 WEA 50 WIND VEL 35 DIR 32
 BAROM 09.1 TEMP DRY 8.9 WET 6.6 RELHU 72 WTRCLR SEA 4 DIR 32 SWELL 2 DIR 32
 CLOUD TYPE 8 AMT 2 VIS 7 WIRE ANGLE(S) 43.30

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	---	---	OXYGEN	---	---	PHOS	NITR	SIL
2	0	9.51	30.440	23.50	9.04	0.807	-0.237	141	0.57	1.9	17		
2	4	9.58	30.450	23.50	8.37	0.748	-0.178	131	0.64	2.3	17		
2	6	9.58	30.518	23.55	10.59	0.946	-0.377	166	0.62	2.0	17		
2	14	9.77	31.673	24.42	7.58	0.677	-0.114	120	0.57	0.8			
2	20	9.95	32.277	24.86	8.01	0.715	-0.157	128	0.75	2.3	8		
2	32	9.94	32.764	25.24	8.73	0.780	-0.224	140	1.11	9.3	13		
2	49	9.14	33.231	25.73	5.19	0.464	0.101	82	1.61	18.2	22		
2	96	8.65	33.449	25.98	4.51	0.403	0.167	71	1.87	22.2	30		
2	112	8.51	33.690	26.19	3.67	0.328	0.243	57	2.13	26.2	33		
1	152	8.23	33.910	26.41	2.97	0.265	0.308	46	2.24	30.2	39		
1	377	5.97	34.066	26.84	1.39	0.124	0.481	21	2.62	37.7	69		
1	565		34.171		0.59	0.053			2.88	42.5	96		
1	754		34.287		0.31	0.028			3.01	42.4	107		
1	1132		34.502		0.59	0.053			3.07	40.2	121		
1	1258		34.530		0.75	0.067			2.96	42.4	143		

DEPTH	BROWN BEAR		CRUISE 318		STATION 089		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.51	0.00	30.440	0.000	23.50	439.7	0.000	0.00	9.04	0.00	0.00	
10	9.65	0.01	31.032	0.076	23.94	398.0	0.043	0.02	10.02	0.96	1.35	
20	9.95	0.00	32.277	0.000	24.86	310.5	0.078	0.07	8.01	0.00	0.00	
30	9.97	0.00	32.721	0.019	25.20	278.2	0.108	0.15	8.71	0.06	0.78	
50	9.12	0.01	33.240	0.008	25.74	226.8	0.159	0.35	5.12	0.06	1.00	
75	8.71	0.10	33.404	0.095	25.94	208.9	0.214	0.70	4.15	0.66	1.30	
100	8.61	0.00	33.509	0.005	26.03	200.2	0.265	1.16	4.30	0.02	0.64	
150	8.24	0.00	33.906	0.004	26.40	166.2	0.358	2.33	2.98	0.01	0.89	
200	7.96	0.04	34.022	0.050	26.53	154.4	0.438	3.77	2.44	0.09	99.99	
250	7.65	0.09	34.093	0.074	26.63	145.5	0.514	5.51	1.99	0.14	99.99	
300	7.20	0.11	34.118	0.068	26.72	138.1	0.586	7.53	1.67	0.12	99.99	
400			34.079	0.001					1.27	0.00	0.83	
500			34.135	0.001					0.81	0.00	0.66	
600			34.192	0.000					0.51	0.01	0.78	
700			34.254	0.001					0.35	0.01	0.64	
800			34.319	0.003					0.31	0.02	0.94	
1000			34.440	0.007					0.43	0.04	0.88	
1200			34.522	0.001					0.66	0.01	9.44	

BROWN BEAR CRUISE 318 STATION 090 OBSERVED VALUES
 DATE 15/03/63 HR 11.9 LAT 45-14 N LONG 125-40 W WEA 20 WIND VEL 26 DIR 32
 BAROM 09.8 TEMP DRY 7.9 WET 5.8 RELHU 74 WTRCLR SECDI 2650 SEA 2 DIR 33 SWELL 3 DIR 33
 CLOUD TYPE VIS 5 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.57	30.676	23.67	6.98	0.623	-0.054		110
1	5	9.60	30.680	23.67	6.90	0.616	-0.048		108
1	10	9.58	30.680	23.68	7.17	0.640	-0.071		113
1	20	9.70	31.090	23.98	6.94	0.620	-0.054		110
1	30	10.10	32.445	24.96	6.41	0.573	-0.017		103
1	49	9.89	32.902	25.36	5.76	0.514	0.042		92
1	74	9.01			3.99	0.356			
1	99	8.88	33.502	25.99	3.58	0.320	0.247		56
1	124	8.67	33.663	26.14	3.10	0.277	0.292		49
1	148	8.25	33.898	26.39	2.64	0.236	0.338		41
1	174	7.96	33.920	26.45	2.47	0.221	0.357		38
1	197	7.63	33.941	26.52	2.51	0.224	0.358		39
1	294	6.58	34.021	26.73	1.87	0.167	0.429		28

BROWN BEAR CRUISE 318 STATION 090 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
		LAB-I	DECK-I
0	2.20	9.27	30.688
2	2.24	7.83	30.637
9	2.52	7.66	30.651
24	2.28	7.96	31.266
100	0.07	0.00	33.746

57.06 188.00 - WATER COLUMN VALUES

MESSENGER TIME 0420 INCOMING SOLAR RADIATION - AM 68 PM 40

DEPTH	BROWN BEAR		CRUISE 318		STATION 090		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.57	0.00	30.676	0.000	23.67	423.1	0.000	0.00	6.98	0.00	1.00		
10	9.58	0.00	30.680	0.000	23.68	423.1	0.043	0.02	7.17	0.00			
20	9.70	0.00	31.090	0.000	23.98	394.6	0.084	0.09	6.94	0.00	0.17		
30	10.10	0.00	32.445	0.000	24.96	300.6	0.119	0.17	6.41	0.00			
50	9.85	0.01	32.920	0.002	25.38	261.9	0.176	0.40	5.69	0.02	0.50		
75	9.00	0.01	33.292	0.021	25.80	221.7	0.237	0.79	3.96	0.01			
100	8.87	0.00	33.509	0.001	25.99	204.2	0.291	1.26	3.56	0.00	6.27		
150	8.23	0.00	33.904	0.003	26.40	166.1	0.384	2.44	2.62	0.00			
200	7.58	0.00	33.944	0.000	26.53	154.8	0.465	3.89	2.52	0.00	62.35		
250	6.87	0.01	33.989	0.000	26.66	142.5	0.540	5.61	2.61	0.03			

BROWN BEAR CRUISE 318 STATION 091 OBSERVED VALUES

DATE 15/03/63 HR 15.3 LAT 45-13 N LONG 125-53 W SNRG 2597 WEA 01 WIND VEL 18 DIR 29
 BAROM 09.8 TEMP DRY 8.1 WET 5.6 RELHU 60 WTRCLR SECDI 9 SEA 2 DIR 29 SWELL 1 DIR 30
 CLOUD TYPE 4 AMT 6 VIS 8 WIRE ANGLE(S) 15,10,30

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	PHOS	NITR	SIL
					MGA/L	AOU			
2	0	9.44	30.607	23.64	7.97	0.712	0.49	1.6	14
2	5	9.46	30.608	23.64	8.65	0.772	0.52	1.5	14
2	10	9.44	30.716	23.73	9.12	0.814	0.60	1.3	14
2	20	9.82	32.059	24.71	8.04	0.718	0.61	1.8	9
2	30	9.91	32.176	24.79	6.79	0.606	0.69	1.6	8
2	49	10.02	32.526	25.04	6.86	0.612	0.82	3.4	10
2	74	9.39	33.274	25.73	5.94	0.530	1.64	19.3	22
2	99	9.09	33.424	25.89	5.30	0.473	1.82	21.2	26
2	124	8.85	33.792	26.22	3.50	0.312	2.16	28.7	35
2	148	8.44	33.894	26.36	2.71	0.242	2.28	30.8	38
2	173	8.03	33.925	26.45	2.64	0.236	2.20	27.0	34
1	191	7.66	33.976	26.54	2.26	0.202	2.27	33.3	44
1	287	6.67	34.011	26.71	2.10	0.188	2.42	35.9	58
3	463	5.36	34.103	26.94	0.99	0.088	2.90	42.8	80
1	481	5.24	34.128	26.98	0.85	0.076	2.89	42.6	86
1	725	4.23	34.296	27.22	0.39	0.035	3.16	44.9	104
1	971	3.69	34.401	27.36	0.31	0.028	3.16	45.5	126
1	1463	2.70	34.540	27.57	0.80	0.071	3.02	44.7	145
1	1960	1.95	34.607	27.68	1.53	0.137	2.81	41.2	150
1	2204	1.84	34.627	27.71	2.08	0.186	2.88	40.0	154
1	2502	1.75	34.650	27.73	2.13	0.190	2.75	38.9	155

BIOLOGICAL DATA

STATION 091

CRUISE 318

BROWN BEAR

SAL

PRODUCTIVITY
LAB-I DECK-I

DEPTH CHL-A

0	1.88	6.15	43.44	30.558
2	3.24	12.02		30.585
9	3.08	9.48		31.132
100	0.07	0.00		33.532

73.44 164.52 - WATER COLUMN VALUES

MESSENGER TIME 0615

INCOMING SOLAR RADIATION - AM 6R PM 40

DEPTH	BROWN BEAR		CRUISE 318		STATION 091		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	9.44	0.00	30.607	0.000	23.64	426.3	0.000	0.00	7.97	0.00	0.95 0.94 0.94 0.89	
10	9.44	0.00	30.716	0.000	23.73	418.3	0.043	0.02	9.12	0.00		
20	9.82	0.00	32.059	0.000	24.71	324.6	0.080	0.08	8.04	0.00		
30	9.91	0.00	32.176	0.000	24.79	317.5	0.113	0.16	6.79	0.00		
50	10.00	0.01	32.559	0.006	25.07	291.0	0.174	0.41	6.83	0.01	0.95 0.94 0.94 0.89	
75	9.37	0.00	33.284	0.005	25.74	228.0	0.239	0.82	5.92	0.01		
100	9.08	0.00	33.439	0.003	25.91	212.4	0.295	1.31	5.23	0.01		
150	8.41	0.00	33.897	0.002	26.37	169.3	0.391	2.52	2.70	0.02		
200	7.53	0.02	33.988	0.006	26.57	150.8	0.472	3.96	2.18	0.05	1.29 1.57 0.96 0.72	
250	6.94	0.06	34.021	0.016	26.68	141.0	0.545	5.65	1.99	0.14		
300	6.55	0.00	34.017	0.001	26.73	136.8	0.615	7.63	2.02	0.02		
400	5.76	0.01	34.072	0.004	26.87	123.9	0.747	12.33	1.39	0.08		
500	5.14	0.00	34.135	0.006	27.00	112.7	0.866	17.83	0.81	0.01	0.94 0.71 0.87 0.68	
600	4.67	0.01	34.207	0.007	27.11	102.8	0.975	23.96	0.55	0.02		
700	4.30	0.01	34.278	0.002	27.20	94.1	1.075	30.58	0.41	0.01		
800	4.04	0.02	34.333	0.001	27.27	87.9	1.167	37.67	0.33	0.01		
1000	3.63	0.00	34.412	0.000	27.38	78.9	1.336	53.21	0.32	0.01	0.97 0.81 0.90 0.74	
1200	3.21	0.01	34.476	0.001	27.47	70.7	1.487	70.30	0.47	0.03		
1500	2.63	0.01	34.547	0.000	27.58	60.6	1.687	97.86	0.84	0.00		
2000	1.93	0.00	34.611	0.000	27.69	49.9	1.968	147.87	1.63	0.01		
2500	1.75	0.00	34.650	0.000	27.73	46.8	2.214	204.89	2.13	0.00	5.36	

BROWN BEAR CRUISE 318 STATION 092 OBSERVED VALUES									
DATE 15/03/63 HR 20.8 LAT 45-18 N LONG 126-02 W SNDG 2605 WEA 58 WIND VEL 25 DIR 25									
BAROM 06.4 TEMP DRY 8.1 WET 6.8 RELHU 84 WTRCLR SECDI 11 SEA 3 DIR 25 SWELL 1 DIR 29									
CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 45.45.27									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	
					MGA/L				
3	0	9.80	32.359	24.95	6.81	0.608	-0.049	109	
3	5	9.81	32.354	24.94	6.91	0.617	-0.058	110	
3	10	9.78	32.362	24.95	7.08	0.632	-0.073	113	
3	19	9.77	32.387	24.97	6.92	0.618	-0.058	110	
3	29	9.96	32.510	25.04	6.84	0.611	-0.054	110	
3	46	10.06	32.648	25.13	6.66	0.595	-0.040	107	
3	70	10.01	33.127	25.51	5.79	0.517	0.037	93	
3	93	8.72	33.365	25.90	4.13	0.369	0.201	65	
3	119	8.33	33.639	26.18	3.52	0.314	0.259	55	
3	139	7.99	33.786	26.34	3.23	0.288	0.289	50	
3	165	7.59	33.891	26.48	2.92	0.261	0.322	45	
1	351	6.89	33.977	26.65	2.43	0.217	0.375	37	
1	423	6.41	33.994	26.73	2.02	0.180	0.418	30	
1	566	5.61	34.058	26.88	1.34	0.120	0.491	20	
1	749	4.46	34.217	27.14	0.44	0.039	0.588	6	
2	932	4.04	34.341	27.28	0.38	0.034	0.600	5	
2	1297	2.86	34.502	27.52	0.57	0.051	0.601	8	
2	1520	2.56	34.533	27.57	0.81	0.072	0.585	11	

BROWN BEAR CRUISE 318 STATION 092 BIOLOGICAL DATA										
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.98	5.46	25.14	4.20	100	50	32.266	0.80	1.5	8
6	2.08	6.09	10.92	5.13	78		32.207	0.75	1.4	8
				4.30	59					
				3.22	41					
				1.39	21					
				0.24	5					
16	1.75	3.83				10	32.375	0.77	1.8	7
31	1.25	2.84	0.46			1	32.543	0.87	2.3	7
150	0.03						33.749	2.15	27.2	33
200	0.00						33.874	2.30	32.8	41

53.79 134.21 250.44 - WATER COLUMN VALUES

MESSENGER TIME 1140 INCOMING SOLAR RADIATION - AM 68 PM 40

LIGHT SATURATION INCUBATOR ILLUMINATION 18300

DEPTH	BROWN BEAR		CRUISE 318		STATION 092		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	9.80	0.00	32.359	0.000	24.95	301.7	0.000	0.00	6.81	0.00		
10	9.78	0.00	32.362	0.000	24.95	301.4	0.031	0.02	7.08	0.00		
20	9.79	0.00	32.398	0.002	24.98	299.0	0.061	0.06	6.91	0.00	0.88	
30	9.97	0.00	32.517	0.002	25.04	293.3	0.091	0.14	6.84	0.00	0.96	
50	10.11	0.03	32.724	0.013	25.18	280.4	0.149	0.38	6.57	0.00	0.65	
75	9.74	0.06	33.188	0.006	25.60	240.9	0.214	0.79	5.42	0.05	0.75	
100	8.56	0.04	33.443	0.003	25.99	204.4	0.270	1.29	3.89	0.04	0.75	
150	7.81	0.00	33.838	0.003	26.41	165.1	0.364	2.46	3.09	0.00	0.67	
200	7.34	0.12	33.954	0.028	26.57	150.7	0.443	3.88	2.74	0.10	2.05	
250	7.08	0.19	34.006	0.046	26.65	144.0	0.517	5.59	2.56	0.16	2.91	
300	6.93	0.15	34.015	0.037	26.67	142.1	0.590	7.63	2.45	0.13	2.06	
400	6.57	0.01	33.989	0.001	26.70	140.6	0.722	12.76	2.16	0.01	0.60	
500	5.97	0.01	34.023	0.001	26.81	131.5	0.870	19.09	1.64	0.01	0.76	
600	5.37	0.02	34.086	0.003	26.93	120.4	0.997	26.25	1.14	0.02	0.81	
700	4.74	0.03	34.172	0.004	27.07	107.3	1.112	33.91	0.64	0.03	0.73	
800	4.31	0.03	34.255	0.000	27.18	97.0	1.215	41.85	0.38	0.02	0.70	
1000	3.81	0.03	34.381	0.001	27.34	83.4	1.398	58.61	0.39	0.00	0.93	
1200	3.15	0.04	34.471	0.001	27.47	70.5	1.553	76.13	0.49	0.01	0.87	
1500	2.56	0.01	34.533	0.000	27.57	60.9	1.753	103.72	0.79	0.00	0.78	

BROWN BEAR CRUISE 318 STATION 093 OBSERVED VALUES
 DATE 16/03/63 HR 04.8 LAT 45-13 N LONG 126-19 W WEA 02 WIND VEL 18 DIR 27
 BAROM 95.9 TEMP DRY 8.4 WET 6.0 RELHU 70 WTRCLR SECDI 2651
 CLOUD TYPE 8 AMT 4 VIS 7 WIRE ANGLE(S) -- SEA 3 DIR 27 SWELL 1 DIR 27

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
1	0	9.86	32.586	25.11	6.45	0.576	-0.018	103	
1	5	9.88	32.586	25.11	6.66	0.595	-0.037	107	
1	10	9.85	32.587	25.12	6.64	0.593	-0.035	106	
1	19	9.86	32.585	25.11	6.60	0.589	-0.032	106	
1	28	9.91	32.591	25.11	6.52	0.582	-0.025	105	
1	45	9.89	32.593	25.11	6.68	0.597	-0.039	107	
1	68	9.76	32.686	25.21	6.19	0.553	0.006	99	
1	91	8.90	33.368	25.88	4.09	0.365	0.202	64	
1	114	7.96	33.352	26.01	3.80	0.339	0.40	59	
1	135	8.06	33.866	26.40	2.99	0.267	0.309	46	
1	158	7.73	33.952	26.51	2.66	0.238	0.343	41	
1	181	7.28	33.954	26.58	2.62	0.234	0.353	40	
1	270	6.09	33.989	26.76	2.04	0.182	0.421	30	

BROWN BEAR CRUISE 318 STATION 093 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.57	0.13	32.586
6	0.63	0.04	32.585

MESSENGER TIME 2100 INCOMING SOLAR RADIATION - AM 68 PM 40

DEPTH	BROWN BEAR		CRUISE 318		STATION 093		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.86	0.00	32.586	0.000	25.11	285.8	0.000	0.00	6.45	0.00		
10	9.85	0.00	32.587	0.000	25.12	285.8	0.029	0.02	6.64	0.00		
20	9.87	0.00	32.586	0.000	25.11	286.3	0.058	0.06	6.59	0.00		
30	9.91	0.00	32.590	0.001	25.11	286.9	0.087	0.13	6.54	0.01	0.86	
50	9.90	0.02	32.584	0.014	25.11	287.5	0.145	0.37	6.68	0.02	0.94	
75	9.54	0.02	32.899	0.045	25.41	259.0	0.214	0.81	5.54	0.12	0.80	
100	8.47	0.05	33.367	0.052	25.94	208.6	0.273	1.33	3.91	0.10	0.69	
150	7.88	0.01	33.955	0.016	26.49	157.3	0.365	2.48	2.73	0.01	0.66	
200	6.88	0.02	33.999	0.027	26.67	141.1	0.440	3.82	2.39	0.11	27.36	
250	6.12	0.05	34.003	0.017	26.77	131.6	0.509	5.41	2.53	0.10	38.62	

BROWN BEAR CRUISE 318 STATION 094 OBSERVED VALUES

DATE 16/03/63 HR 07.7 LAT 45-14 N LONG 126-35 W SNRG 2743 WEA 52 WIND VEL 20 DIR 27
 BAROM 97.0 TEMP DRY 8.4 WET 6.6 RELHU 77 WTRCLR SECD SEA 3 DIR 27 SWELL 1 DIR 27
 CLOUD TYPE 8 AMT 4 VIS 7 WIRE ANGLE(S) 30, ---, ---, 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
4	0	10.02	32.601	25.10	6.67	0.596	-0.040	107	0.88	4.0	8	
4	5	10.06	32.603	25.09	6.56	0.586	-0.031	106	0.83	3.4	8	
4	10	10.01	32.603	25.10	6.55	0.585	-0.029	105	0.83	3.4	6	
4	20	10.00	32.595	25.10	6.49	0.580	-0.024	104	0.85	3.4	7	
4	30	10.09	32.598	25.09	6.60	0.589	-0.035	106	0.85	3.4	5	
4	49	10.04	32.594	25.09	6.54	0.584	-0.029	105	0.90	3.4	8	
4	74	10.03	32.608	25.10	6.60	0.589	-0.034	106	0.83	3.6	6	
4	99	8.71	33.212	25.79	4.93	0.440	0.130	77	1.54	18.2	20	
4	124	8.40	33.522	26.08	4.12	0.368	0.205	64	1.84	24.6	28	
4	148	7.88	33.721	26.31	3.69	0.330	0.250	57	1.99	27.9	35	
4	176	7.26	33.852	26.50	3.60	0.322	0.266	55	2.03	30.2	38	
1	176	7.21	33.861	26.51	3.37	0.301	0.287	51	2.00	30.8	40	
1	263	6.27	34.003	26.75	2.09	0.187	0.414	31	2.48	37.2	60	
1	441	5.06	34.097	26.97	0.99	0.088	0.530	14	2.79	43.1	83	
1	666	4.26	34.262	27.19	0.37	0.033	0.597	5	2.93	45.5	109	
1	891	3.66	34.370	27.34	0.28	0.025	0.615	4	3.08	43.8	115	
2	1471	2.68	34.517	27.55	0.73	0.065	0.590	10	2.91	43.5	134	
3	1755	2.43	34.572	27.62	1.21	0.108	0.551	16	2.91	44.2	144	

BROWN BEAR CRUISE 318 STATION 094 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 68 PM 40

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0309-0319 DEPTHS 100, 70, 35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 094		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	10.02	0.00	32.601	0.000	25.10	287.2	0.000	0.00	6.67	0.00	0.95 0.94 0.94 0.92			
10	10.01	0.00	32.603	0.000	25.10	287.1	0.029	0.02	6.55	0.00				
20	10.00	0.00	32.595	0.000	25.10	287.7	0.058	0.06	6.49	0.00				
30	10.09	0.00	32.598	0.000	25.09	289.2	0.087	0.13	6.60	0.00				
50	10.05	0.01	32.589	0.004	25.08	289.6	0.146	0.37	6.56	0.01	0.95 0.94 0.94 0.92			
75	9.98	0.01	32.629	0.006	25.13	285.9	0.218	0.84	6.54	0.02				
100	8.69	0.01	33.228	0.001	25.80	222.2	0.282	1.40	4.89	0.00				
150	7.83	0.00	33.733	0.000	26.33	173.1	0.382	2.65	3.67	0.00				
200	6.89	0.03	33.919	0.009	26.61	147.1	0.463	4.08	3.17	0.13	1.12 0.82 0.92 0.76			
250	6.36	0.02	33.995	0.006	26.73	135.3	0.534	5.72	2.34	0.06				
300	5.96	0.01	34.032	0.008	26.82	128.1	0.600	7.59	1.76	0.04				
400	5.27	0.01	34.086	0.009	26.94	116.9	0.724	12.01	1.13	0.04				
500	4.80	0.02	34.141	0.004	27.04	108.3	0.837	17.25	0.76	0.01	0.76 0.71 0.82 0.58			
600	4.44	0.02	34.214	0.004	27.14	99.6	0.942	23.16	0.48	0.01				
700	4.16	0.00	34.281	0.001	27.22	92.3	1.039	29.63	0.33	0.01				
800	3.88	0.00	34.331	0.001	27.29	86.2	1.130	36.58	0.28	0.02				
1000	3.42	0.00	34.407	0.004	27.39	77.0	1.295	51.78	0.30	0.01	1.03 1.07 0.96			
1200	3.05	0.01	34.463	0.006	27.47	69.9	1.444	68.55	0.41	0.01				
1500	2.65	0.00	34.522	0.001	27.56	62.7	1.645	96.45	0.77	0.00				

DATE 16/03/63
BAROM 99.0
CLOUD TYPE 9

HR 13.9
TEMP DRY 6.5
VIS 7

LAT 45-14 N
LONG 126-49 W
RELHU 74
WIRE ANGLE(S) 10

CRUISE 318
STATION 095

OBSERVED VALUES
WIND VEL 12 DIR 29
SEA 0 DIR
SWELL 1 DIR 29

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
1	0	9.85	32.577	25.11	6.60	0.589	-0.031	106	
1	5	9.88	32.564	25.09	6.79	0.606	-0.049	109	
1	10	9.86	32.568	25.10	6.60	0.589	-0.032	106	
1	20	9.86	32.575	25.11	6.52	0.582	-0.024	104	
1	30	9.92	32.566	25.09	6.48	0.579	-0.022	104	
1	49	9.91	32.565	25.09	6.51	0.581	-0.024	104	
1	74	9.45	32.751	25.31	5.95	0.531	0.031	94	
1	98	8.41	33.481	26.04	3.82	0.341	0.232	60	
1	123	8.24	33.710	26.25	3.30	0.295	0.280	51	
1	147	7.92	33.823	26.38	2.98	0.266	0.312	46	
1	173	7.61	33.918	26.50	2.82	0.252	0.330	43	
1	195	7.29	33.942	26.57	2.61	0.233	0.353	40	
1	293	6.36	34.012	26.75	1.85	0.165	0.434	28	

DEPTH
0
6
16
31
100

CHL-A
0.22
0.40
0.34
0.53
0.03

PRODUCTIVITY
LAB-I
0.62
0.82
0.94
0.52
0.00

CRUISE 318
STATION 095

BIOLOGICAL DATA
SAL
3.10
32.580
32.568
32.556
32.633
33.618

12.03
24.07

WATER COLUMN VALUES
INCOMING SOLAR RADIATION - AM 168 PM 172

DEPTH	BROWN BEAR		CRUISE 318		STATION 095		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.85	0.00	32.577	0.000	25.11	286.3	0.000	0.00	6.60	0.00		
10	9.86	0.00	32.568	0.000	25.10	287.3	0.029	0.02	6.60	0.00		
20	9.86	0.00	32.575	0.000	25.11	287.0	0.058	0.06	6.52	0.00		
30	9.92	0.00	32.566	0.000	25.09	288.8	0.087	0.13	6.48	0.00		
50	9.90	0.00	32.565	0.002	25.09	289.0	0.146	0.37	6.51	0.01	0.95	
75	9.40	0.01	32.781	0.007	25.34	265.6	0.215	0.82	5.86	0.02	0.94	
100	8.38	0.01	33.511	0.005	26.07	196.6	0.274	1.33	3.74	0.02	0.89	
150	7.89	0.00	33.837	0.001	26.40	166.2	0.365	2.48	2.96	0.00	0.86	
200	7.21	0.00	33.943	0.001	26.58	149.8	0.445	3.91	2.56	0.00	7.65	
250	6.55	0.04	34.016	0.018	26.73	136.1	0.517	5.56	2.04	0.04	67.32	

BROWN BEAR CRUISE 318 STATION 096 OBSERVED VALUES
 DATE 16/03/63 HR 16.6 LAT 45-14 N LONG 127-04 W SNRG 2779 WEA 02 WIND VEL 13 DIR 32
 BAROM 00.3 TEMP DRY 6.9 WET 4.9 RELHU 74 WTRCLR SECDI 14 SEA 3 DIR 32 SWELL 1 DIR 29
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 18,15,10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
3	0	9.78	32.706	25.22	6.63	0.592	-0.034	106
3	5	9.81	32.705	25.21	6.57	0.587	-0.029	105
3	10	9.76	32.707	25.22	6.70	0.598	-0.040	107
3	20	9.76	32.712	25.23	6.57	0.587	-0.028	105
3	30	9.82	32.705	25.21	6.56	0.586	-0.028	105
3	49	9.81	32.718	25.22	6.52	0.582	-0.024	104
3	74	9.83	33.528	25.70	4.43	0.396	0.160	71
3	99	8.22	33.654	25.21	3.59	0.321	0.254	56
3	124	8.02	33.817	26.36	3.18	0.284	0.293	49
3	148	7.69	33.904	26.48	2.75	0.246	0.335	42
3	174	7.40	33.952	26.56	2.54	0.227	0.358	39
1	186	7.27	33.957	26.58	2.50	0.223	0.363	38
1	467	5.10	34.119	26.99	0.77	0.069	0.549	11
1	701	4.27	34.278	27.21	0.32	0.029	0.602	5
1	939	3.64	34.390	27.36	0.28	0.025	0.615	4
1	1222	2.90	34.491	27.51	0.58	0.052	0.600	8
1	1412	2.57	34.523	27.56	0.74	0.066	0.591	10
2	1697		34.573		1.24	0.111		

BROWN BEAR CRUISE 318 STATION 096 BIOLOGICAL DATA									
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	0.73	1.53	6.90			32.742	0.94	3.2	6
7	1.09	2.41	14.64			32.697	0.95	4.8	8
24	1.07	2.03	2.62	1.54	100	32.723	0.97	5.3	9
				1.85	78				
				1.61	59				
				1.74	41				
				1.00	21				
				0.03	5				
51	1.31	1.58	0.34			32.716	0.97	5.1	9
150	0.09					33.541	2.02	26.7	30
200	0.04					33.936	2.03	26.4	29

56.84 100.26 262.06 - WATER COLUMN VALUES

MESSANGER TIME 1145 INCOMING SOLAR RADIATION - AM 168 PM 172

LIGHT SATURATION INCUBATOR ILLUMINATION 17600

DEPTH	BROWN BEAR		CRUISE 318		STATION 096		INTERPOLATED AND COMPUTED VALUES					
	TEMP	F(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0 10 20 30	9.78	0.00	32.706	0.000	25.22	275.7	0.000	0.00	6.63	0.00		
	9.76	0.00	32.707	0.000	25.22	275.5	0.028	0.01	6.70	0.00		
	9.76	0.00	32.712	0.000	25.23	275.3	0.056	0.06	6.57	0.00		
	9.82	0.00	32.705	0.000	25.21	276.9	0.084	0.13	6.56	0.00		
50 75 100 150	9.83	0.01	32.739	0.006	25.24	274.9	0.139	0.36	6.45	0.02	0.95	
	9.77	0.02	33.345	0.001	25.72	229.6	0.203	0.76	4.38	0.01	0.94	
	8.20	0.01	33.663	0.001	26.22	182.8	0.255	1.22	3.57	0.00	0.94	
	7.67	0.00	33.908	0.001	26.49	157.8	0.341	2.30	2.73	0.00	0.95	
200 250 300 400	7.13	0.00	33.979	0.010	26.62	145.9	0.417	3.67	2.36	0.01	2.07	
	6.65	0.01	34.026	0.023	26.72	136.7	0.488	5.31	1.98	0.01	4.27	
	6.21	0.01	34.063	0.030	26.81	129.0	0.556	7.20	1.64	0.00	5.42	
	5.49	0.01	34.109	0.021	26.93	117.7	0.680	11.65	1.07	0.00	2.86	
500 600 700 800	4.95	0.01	34.142	0.001	27.02	109.9	0.795	16.94	0.67	0.01	0.80	
	4.56	0.03	34.211	0.003	27.12	101.2	0.901	22.95	0.43	0.02	0.63	
	4.27	0.00	34.277	0.000	27.21	93.9	1.000	29.52	0.32	0.00	0.99	
	3.99	0.01	34.329	0.001	27.28	87.7	1.092	36.59	0.26	0.01	0.64	
1000 1200 1500	3.47	0.01	34.416	0.001	27.40	76.8	1.258	51.90	0.33	0.01	0.79	
	2.95	0.00	34.485	0.000	27.50	67.2	1.404	68.32	0.55	0.01	0.93	
			34.536	0.002					0.85	0.01	1.60	

BROWN BEAR CRUISE 318 STATION 097 OBSERVED VALUES

DATE 16/03/63 HR 22.1 LAT 45-14 N LONG 127-18 W SNGD 2760 WEA 02 WIND VEL 15 DIR 31
 BAROM 02.4 TEMP DRY 8.4 WEI 5.4 RELHU 63 WTRCLR SEA 2 DIR 31 SWELL 6 DIR 32
 CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ML/L	AOU	SATN
					ML/L	MGA/L			
1	0	9.57	32.526	25.11	6.46	0.577	-0.015	103	
1	5	9.58	32.537	25.12	6.62	0.591	-0.030	105	
1	10	9.52	32.543	25.14	6.65	0.594	-0.032	106	
1	20	9.48	32.532	25.13	6.60	0.589	-0.027	105	
1	29	9.50	32.532	25.13	6.58	0.588	-0.025	104	
1	48	9.53	32.537	25.13	6.57	0.591	-0.029	105	
1	72	9.49	32.537	25.14	6.57	0.587	-0.024	104	
1	97	8.34	33.436	26.02	4.01	0.358	0.216	62	
1	121	8.43	33.722	26.23	3.27	0.292	0.280	51	
1	144	8.18	33.839	26.36	2.98	0.266	0.309	46	
1	168	7.86	33.849	26.41	2.95	0.263	0.316	46	
1	192	7.64	33.933	26.51	2.65	0.237	0.345	41	
1	288	6.53	33.985	26.70	2.14	0.191	0.406	32	

BROWN BEAR CRUISE 318 STATION 097 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL	GEOPT	POT	OXY	E(O)	VAR
						ANOMALY	ANOMALY	ENERGY	ML/L		RATIO
0	9.57	0.00	32.526	0.000	25.11	285.8	0.000	0.00	6.46	0.00	
10	9.52	0.00	32.543	0.000	25.14	283.9	0.029	0.02	6.65	0.00	
20	9.48	0.00	32.532	0.000	25.13	284.3	0.058	0.06	6.60	0.00	
30	9.50	0.00	32.532	0.000	25.13	284.8	0.086	0.13	6.58	0.00	0.98
50	9.55	0.01	32.521	0.011	25.11	286.7	0.144	0.37	6.66	0.03	0.91
75	9.35	0.04	32.637	0.027	25.24	275.5	0.215	0.82	6.28	0.08	0.85
100	8.33	0.03	33.492	0.007	26.06	197.3	0.274	1.34	3.86	0.02	0.83
150	8.10	0.01	33.843	0.006	26.37	168.7	0.367	2.51	2.97	0.02	0.73
200	7.58	0.01	33.969	0.005	26.55	152.9	0.448	3.96	2.52	0.02	11.89
250	7.15	0.04	33.973	0.031	26.61	147.4	0.523	5.70	2.36	0.10	64.88

BROWN BEAR CRUISE 318 STATION 098 OBSERVED VALUES

DATE 17/03/63 HR 01.1 LAT 45-14 N LONG 127-32 W SNG 2779 WEA 15 WIND VEL 10 DIR 32
 BAROM 03.7 TEMP DRY 7.8 WET 5.8 RELHU 75 WTRCLR SECDI 18 SEA 2 DIR 32 SWELL 2 DIR 30
 CLOUD TYPE 6 AMT 3 VIS 8 WIRE ANGLE(S) 20,15,---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
3	0	9.66	32.568	25.13	6.64	0.593	-0.033	106
3	5	9.72	32.568	25.12	6.57	0.587	-0.027	105
3	10	9.63	32.570	25.14	6.58	0.588	-0.027	105
3	20	9.66	32.574	25.14	6.63	0.592	-0.032	106
3	30	9.70	32.567	25.13	6.56	0.586	-0.026	105
3	49	9.67	32.570	25.13	6.41	0.573	-0.012	102
3	74	9.09	33.303	25.80	4.25	0.380	0.185	67
3	99	8.57	33.747	26.23	3.03	0.271	0.299	47
3	124	8.38	33.817	26.31	2.81	0.251	0.321	44
3	148	8.23	33.860	26.37	2.75	0.246	0.328	43
3	175	7.97	33.902	26.44	2.81	0.251	0.326	43
1	185	7.99	33.890	26.43	2.66	0.238	0.339	41
1	282	6.98	34.000	26.66	2.27	0.203	0.388	34
1	472	5.21	34.087	26.95	1.07	0.096	0.521	16
1	709	4.30	34.272	27.23	0.31	0.028	0.602	4
1	948	3.64	34.383	27.35	0.28	0.025	0.615	4
2	1472	2.65	34.522	27.56	0.70	0.063	0.593	10
2	1773	2.14			1.19	0.106		

BROWN BEAR CRUISE 318 STATION 098 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.15	0.55		32.580
7	0.52	0.33		32.578
24	0.57	0.59		32.589
51	0.61	0.65		32.598

27.56 27.47 - WATER COLUMN VALUES

MESSENGER TIME 1635 INCOMING SOLAR RADIATION - AM 168 PM 172

BROWN BEAR				CRUISE 318			STATION 098		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)		SAL	E(S)	SIGMA-T	SP VOL ANOMLY	GEOPT ANOMLY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9.66	0.00		32.568	0.000	25.13	284.0	0.000	0.00	6.64	0.00			
10	9.63	0.00		32.570	0.000	25.14	283.6	0.029	0.02	6.58	0.00			
20	9.66	0.00		32.574	0.000	25.14	284.0	0.058	0.06	6.63	0.00			
30	9.70	0.00		32.567	0.000	25.13	285.3	0.086	0.13	6.56	0.00			
50	9.65	0.00		32.594	0.007	25.15	282.9	0.144	0.37	6.34	0.02	0.95		
75	9.07	0.00		33.327	0.001	25.82	220.0	0.207	0.76	4.18	0.00	0.94		
100	8.56	0.00		33.754	0.002	26.23	181.3	0.257	1.21	3.01	0.01	0.94		
150	8.22	0.00		33.862	0.001	26.37	169.1	0.346	2.34	2.75	0.00	0.94		
200	7.78	0.03		33.922	0.008	26.48	159.2	0.428	3.82	2.70	0.06	1.40		
250	7.29	0.01		33.975	0.005	26.59	149.1	0.506	5.61	2.49	0.05	1.02		
300	6.79	0.01		34.011	0.003	26.69	140.4	0.579	7.67	2.16	0.02	0.95		
400	5.81	0.03		34.061	0.009	26.86	125.4	0.713	12.45	1.53	0.04	0.74		
500	5.06	0.02		34.109	0.003	26.98	113.7	0.834	18.00	0.94	0.00	0.87		
600	4.61	0.05		34.186	0.007	27.10	103.7	0.944	24.19	0.56	0.00	0.67		
700	4.32	0.01		34.265	0.001	27.19	95.4	1.044	30.89	0.32	0.00	0.94		
800	4.03	0.01		34.320	0.002	27.27	88.7	1.137	38.05	0.25	0.02	0.64		
1000	3.52	0.01		34.400	0.002	27.38	78.6	1.307	53.63	0.29	0.00	1.57		
1200	3.12	0.02		34.454	0.009	27.46	71.4	1.459	70.76	0.41	0.00	4.13		
1500	2.60	0.00								0.74	0.00	0.99		

BROWN BEAR CRUISE 318 STATION 099 OBSERVED VALUES
 DATE 17/03/63 HR 05.0 LAT 45-14 N LONG 127-45 W WEA 02 WIND VEL 15 DIR 32
 BAROM 07.5 TEMP DRY 8.3 WET 7.1 RELHU 85 WTRCLR SECD1 SWELL 1 DIR 30
 CLOUD TYPE 2 AMT 6 VIS 7 WIRE ANGLE(S) 15 SEA 3 DIR 32

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.60	32.338	24.96	6.61	0.590	-0.028		105
1	5	9.66	32.388	24.99	6.66	0.595	-0.034		106
1	10	9.59	32.506	25.10	6.79	0.606	-0.045		108
1	19	9.59	32.463	25.06	6.75	0.603	-0.041		107
1	29	9.66	32.559	25.13	6.76	0.604	-0.043		108
1	47	9.65	32.566	25.13	6.81	0.608	-0.048		109
1	71	9.63	32.572	25.14	7.48	0.668	-0.107		119
1	95	8.73	33.276	25.83	4.86	0.434	0.136		76
1	120	8.11	33.576	26.16	3.71	0.331	0.245		57
1	143	8.01	33.753	26.31	3.66	0.327	0.250		57
1	167	7.81	33.885	26.45	3.26	0.291	0.288		50
1	192	7.50	33.935	26.53	2.70	0.241	0.342		41
1	286	6.45	34.000	26.73	2.11	0.188	0.410		32

BROWN BEAR CRUISE 318 STATION 099 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	0.52	0.79			32.620
7	0.66	0.54			32.544
24	0.75	0.64			32.564
51	0.75	0.13			32.619
100	0.04				33.345

36.38 25.08 - WATER COLUMN VALUES

MESSENGER TIME 2110 INCOMING SOLAR RADIATION - AM 168 PM 172

DEPTH	BROWN BEAR		CRUISE 318		STATION 099		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.60	0.00	32.338	0.000	24.96	300.2	0.000	0.00	6.61	0.00		
10	9.59	0.00	32.506	0.000	25.10	287.7	0.030	0.02	6.79	0.00		
20	9.60	0.00	32.471	0.003	25.07	290.6	0.059	0.06	6.75	0.00	0.88	
30	9.66	0.00	32.562	0.002	25.13	285.0	0.088	0.13	6.76	0.00	0.97	
50	9.67	0.02	32.548	0.013	25.11	286.6	0.146	0.37	6.96	0.07	0.87	
75	9.50	0.03	32.	0.026	25.25	274.7	0.217	0.82	7.11	0.11	0.80	
100	8.57	0.01	33.	0.009	25.92	210.8	0.278	1.36	4.52	0.01	0.77	
150	7.96	0.00	33.757	0.001	26.36	170.1	0.374	2.57	3.57	0.01	0.71	
200	7.39	0.00	33.939	0.003	26.55	152.5	0.455	4.02	2.52	0.01	12.03	
250	6.72	0.04	34.029	0.021	26.71	137.4	0.528	5.70	2.18	0.09	57.58	

BROWN BEAR CRUISE 318 STATION 100 OBSERVED VALUES												
DATE 17/03/63		HR 10.4	LAT 45-13 N	LONG 127-57 W	SNRG 2743	WEA 01	WIND VEL 14 DIR 33					
BAROM 09.1		TEMP DRY 8.6	WET 6.4	RELHU 74	WTRCLR	SEA 2 DIR 33	SWELL 1 DIR 31					
CLOUD TYPE 8		AMT 2	VIS 7	WIRE ANGLE(S) 20,---	SEC DI							
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	9.67	32.576	25.14	6.84	0.611	-0.051	109	0.86	3.5	8	
2	5	9.74	32.575	25.13	4.78	0.427	0.132	76	0.87	3.9	8	
2	10	9.66	32.566	25.13	6.65	0.594	-0.033	106	0.89	3.9	7	
2	20	9.64	32.572	25.14	6.53	0.583	-0.023	104	0.85	3.7	8	
2	29	9.73	32.568	25.12	6.70	0.598	-0.039	107	1.02	3.7	7	
2	47	9.72	32.572	25.13	6.53	0.583	-0.024	104	0.86	3.7	7	
2	71	9.70	32.570	25.13	6.84	0.611	-0.051	109	0.89	3.9	7	
2	95	8.30	33.003	25.68	5.29	0.472	0.104	82	1.44	15.4	17	
2	118	8.07	33.449	26.07	4.24	0.379	0.199	66	1.80	23.3	25	
2	140	7.60	33.717	26.35	4.01	0.358	0.225	61	1.88	25.3	32	
2	163	7.34	33.848	26.49	3.66	0.327	0.259	56	2.06	27.8	36	
1	190	7.22	33.880	26.53	4.01	0.358	0.230	61	2.21	28.3	38	
1	285	6.11	34.024	26.79	2.78	0.248	0.355	41	2.43	32.5	52	
1	478	4.62	34.038	26.98	1.11	0.099	0.527	16	2.87	43.1	79	
1	718	4.35	34.290	27.21	0.28	0.025	0.604	4	3.14	45.5	96	
1	959	3.61	34.388	27.36	0.26	0.023	0.617	4	3.19	43.7	114	
1	1499	2.62	34.518	27.56	1.01	0.090	0.566	14	3.02	43.5	135	
1	1744	2.18	34.578	27.64	1.03	0.092	0.572	14	3.39	31.6	174	

BROWN BEAR CRUISE 318 STATION 100				BIOLOGICAL DATA	
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL		
0	0.38	0.72	32.537		
7	0.46	0.88	32.579		
24	0.45	0.98	32.671		
51	0.50	0.76	32.569		
100	0.01				
23.66		18.76 - WATER COLUMN VALUES			
MESSENGER TIME 0412		INCOMING SOLAR RADIATION - AM 167 PM 127			
ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME		0056-0106 DEPTHS 100, 70			
		0127-0137 35, 0			

DEPTH	BROWN BEAR		CRUISE 318		STATION 100		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.67	0.00	32.576	0.000	25.14	283.6	0.000	0.00	6.84	0.00	0.98		
10	9.66	0.00	32.566	0.000	25.13	284.4	0.029	0.02	6.65	0.00			
20	9.64	0.00	32.572	0.000	25.14	283.8	0.058	0.06	6.53	0.00			
30	9.73	0.00	32.568	0.000	25.12	285.7	0.086	0.13	6.69	0.01			
50	9.76	0.03	32.560	0.008	25.11	287.0	0.144	0.37	6.60	0.05	0.87		
75	9.47	0.06	32.626	0.009	25.21	278.2	0.215	0.83	6.63	0.05	0.80		
100	8.22	0.04	33.106	0.006	25.78	224.3	0.279	1.39	5.01	0.01	0.75		
150	7.46	0.00	33.789	0.002	26.42	163.8	0.376	2.60	3.83	0.03	0.64		
200	7.12	0.02	33.896	0.002	26.55	152.0	0.456	4.03	3.96	0.06	1.12		
250	6.57	0.05	33.973	0.005	26.69	139.6	0.530	5.72	3.44	0.16	1.01		
300	5.96	0.00	34.029	0.006	26.81	128.3	0.597	7.62	2.61	0.00	0.97		
400	5.09	0.00	34.045	0.022	26.93	117.8	0.721	12.06	1.66	0.01	0.76		
500	4.57	0.03	34.059	0.006	27.00	111.6	0.837	17.40	0.99	0.01	0.90		
600	4.40	0.09	34.159	0.017	27.10	103.2	0.946	23.51	0.55	0.02	0.67		
700	4.35	0.03	34.269	0.005	27.19	95.4	1.046	30.20	0.30	0.01	0.90		
800	4.11	0.02	34.333	0.005	27.27	88.8	1.139	37.37	0.22	0.02	0.66		
1000	3.52	0.01	34.400	0.001	27.38	78.6	1.308	52.95	0.31	0.02	0.98		
1200	3.11	0.04	34.453	0.005	27.46	71.3	1.460	70.07	0.59	0.09	1.03		
1500	2.62	0.00	34.518	0.000	27.56	62.7	1.664	98.22	1.01	0.00	1.00		

BROWN BEAR CRUISE 318 STATION 100A BIOLOGICAL DATA

DATE 17/03/63 LAT 45-26 N LONG 127-55 W

DEPTH CHL-A PRODUCTIVITY
LAB-I DECK-I

CAL

0 4.18 32.605

MESSENGER TIME 0605 INCOMING SOLAR RADIATION - AM 167 PM 127

BROWN BEAR CRUISE 318 STATION 101 OBSERVED VALUES
 DATE 17/03/63 HR 21.0 LAT 46-14 N LONG 127-58 W SNOG 2596 WEA 51 WIND VEL 15 DIR 29
 BAROM 15.2 TEMP DRY 8.2 WEI 6.9 RELHU 84 WTRCLR SECDI 19 SEA 1 DIR 29 SWELL 3 DIR 27
 CLOUD TYPE 7 AMT 8 VIS 6 WIRE ANGLE(S) 15, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	SAFN
					MGA/L	AOU	
2	0	9.70	32.570	25.13	6.70	0.598	107
2	5	9.74	32.568	25.12	6.49	0.580	104
2	10	9.66	32.570	25.13	6.55	0.585	104
2	20	9.63	32.572	25.14	6.72	0.600	107
2	30	9.67	32.570	25.13	6.54	0.584	104
2	49	9.66	32.572	25.14	6.49	0.580	103
2	72	9.63	32.575	25.14	6.44	0.575	103
2	98	9.60	32.578	25.15	6.45	0.576	103
2	123	8.08	33.284	25.94	4.52	0.404	70
2	146	7.68	33.504	26.17	4.23	0.378	65
2	170	7.56	33.754	26.38	3.65	0.326	56
1	186	7.38	33.838	26.47	3.45	0.308	53
1	284	6.22	34.014	26.77	2.50	0.223	37
1	475	4.92	34.084	26.98	0.93	0.083	13
1	713	4.16	34.290	27.23	0.31	0.028	4
1	952	3.61	34.371	27.35	0.29	0.026	4
1	1433	2.68	34.524	27.56	0.62	0.055	8
1	1725	2.23	34.574	27.63	1.05	0.094	14

BROWN BEAR CRUISE 318 STATION 101			BIOLOGICAL DATA						
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0		0.29	9.74			32.558	0.90	3.9	5
8	0.22	0.39	4.90			32.564	0.93	2.7	4
22	0.27	0.38	0.64			32.598	0.96	3.9	6
54			0.88	0.27	78				
54				0.20	78				
54				0.08	22				
100	0.22	0.30		0.00	5	32.560	0.92	4.0	5
200	0.01					33.562	1.89	24.8	30

13.19 121.58 - WATER COLUMN VALUES

MESSANGER TIME 1220 INCOMING SOLAR RADIATION - AM 167 PM 127

LIGHT SATURATION INCUBATOR ILLUMINATION 17100

DEPTH	BROWN BEAR		CRUISE 318		STATION 101		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(C)			
0	9.70	0.00	32.570	0.000	25.13	284.5	0.000	0.00	6.70	0.00	0.95		
10	9.66	0.00	32.570	0.000	25.13	284.1	0.029	0.02	6.55	0.00			
20	9.63	0.00	32.572	0.000	25.14	283.7	0.058	0.06	6.72	0.00			
30	9.67	0.00	32.570	0.000	25.13	284.6	0.086	0.13	6.54	0.00	0.89		
50	9.66	0.00	32.572	0.000	25.14	284.6	0.144	0.37	6.49	0.00			
75	9.65	0.02	32.562	0.009	25.13	285.8	0.216	0.83	6.48	0.02			
100	9.49	0.03	32.630	0.015	25.21	278.5	0.287	1.47	6.30	0.04	0.81		
150	7.66	0.01	33.550	0.004	26.21	184.3	0.403	2.90	4.13	0.01			
200	7.21	0.01	33.884	0.010	26.53	154.1	0.488	4.42	3.30	0.01			
250	6.61	0.02	33.991	0.018	26.70	138.8	0.562	6.11	2.80	0.01	1.59		
300	6.07	0.01	34.025	0.006	26.80	130.1	0.630	8.02	2.34	0.01			
400	5.32	0.03	34.073	0.018	26.93	118.4	0.755	12.50	1.47	0.02			
500	4.81	0.01	34.105	0.004	27.01	111.0	0.871	17.84	0.82	0.01	0.88		
600	4.45	0.03	34.192	0.011	27.12	101.3	0.979	23.88	0.47	0.04			
700	4.19	0.01	34.279	0.002	27.22	92.8	1.077	30.42	0.32	0.01			
800	3.94	0.01	34.327	0.005	27.28	87.3	1.168	37.43	0.26	0.02	0.65		
1000	3.51	0.00	34.389	0.001	27.37	79.3	1.336	52.95	0.30	0.00	0.95		
1200	3.10	0.00	34.456	0.003	27.46	71.0	1.488	70.11	0.40	0.00	0.88		
1500	2.57	0.00	34.540	0.001	27.58	60.5	1.689	97.70	0.70	0.00	0.96		

BROWN BEAR CRUISE 318 STATION 102 OBSERVED VALUES
 DATE 18/03/63 HR 06.5 LAT 47-16 N LONG 127-58 W WEA 02 WIND VEL 15 DIR 31
 BAROM 16.6 TEMP DRY 8.6 WET 6.6 REI HU 75 WTR CLR SECDI 2651 SEA 3 DIR 31 SWELL 1 DIR 27
 CLOUD TYPE 6 AMT 5 VIS 7 WIRE ANGLE(S) 10.5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
2	0	8.78	32.400	25.14	6.80	0.607	-0.035	106
2	5	8.83	32.398	25.13	6.76	0.604	-0.032	106
2	10	8.76	32.399	25.14	6.72	0.600	-0.027	105
2	20	8.78	32.398	25.14	6.72	0.600	-0.028	105
2	30	8.82	32.422	25.15	6.68	0.597	-0.025	104
2	49	8.81	32.404	25.14	6.60	0.589	-0.017	103
2	74	8.78	32.446	25.18	6.54	0.584	-0.012	102
2	99	7.83	32.997	25.75	5.16	0.461	0.122	79
2	124	7.38	33.581	26.27	3.94	0.352	0.235	60
2	148	7.06	33.770	26.46	4.05	0.362	0.229	61
2	174	6.87	33.916	26.60	3.21	0.287	0.306	48
1	196	6.71	33.925	26.63	3.15	0.281	0.313	47
1	292	5.78	34.001	26.81	1.74	0.155	0.453	26
1	490	4.67	34.128	27.04	0.64	0.057	0.567	9
1	733	4.09	34.284	27.23	0.31	0.028	0.605	4
1	978	3.40	34.400	27.39	0.28	0.025	0.619	4
1	1472	2.48	34.528	27.58	0.72	0.064	0.594	10
1	1767	2.10	34.582	27.65	1.13	0.101	0.564	15

BROWN BEAR CRUISE 318 STATION 102			BIOLOGICAL DATA
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL
0	0.49		32.413
8	0.61		32.388
22	0.63		32.382
54	0.45		32.413
100	0.00		33.108

30.18 - WATER COLUMN VALUES

MESSANGER TIME 2311 INCOMING SOLAR RADIATION - AM 167 PM 127

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0005-0015 DEPTHS 100, 70
35, 0

DEPTH	BROWN BEAR		CRUISE 318		STATION 102		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMLY	GEOPT ANOMLY	POT ENERGY	OXY ML/L	E(O)		
0	8.78	0.00	32.400	0.000	25.14	283.3	0.000	0.00	6.80	0.00		
10	8.76	0.00	32.399	0.000	25.14	283.2	0.029	0.02	6.72	0.00		
20	8.78	0.00	32.398	0.000	25.14	283.8	0.058	0.06	6.72	0.00		
30	8.82	0.00	32.422	0.000	25.15	282.7	0.086	0.13	6.68	0.00		
50	8.82	0.01	32.400	0.003	25.13	284.7	0.143	0.37	6.61	0.01	0.95	
75	8.75	0.01	32.463	0.003	25.19	279.4	0.214	0.82	6.50	0.01	0.94	
100	7.81	0.00	33.024	0.003	25.77	224.7	0.278	1.38	5.10	0.01	0.94	
150	7.04	0.00	33.785	0.001	26.48	158.4	0.374	2.58	3.99	0.02	0.90	
200	6.67	0.00	33.928	0.000	26.64	143.7	0.450	3.94	3.10	0.02	1.09	
250	6.19	0.03	33.965	0.003	26.73	135.4	0.521	5.56	2.44	0.10	1.34	
300	5.72	0.00	34.007	0.000	26.82	127.0	0.587	7.43	1.66	0.01	0.98	
400	5.07	0.02	34.073	0.002	26.95	115.4	0.709	11.80	0.94	0.07	0.78	
500	4.64	0.01	34.135	0.000	27.05	106.8	0.822	16.96	0.61	0.01	0.95	
600	4.36	0.04	34.201	0.002	27.14	99.6	0.926	22.84	0.40	0.03	0.67	
700	4.15	0.02	34.264	0.001	27.21	93.4	1.023	29.35	0.31	0.02	0.83	
800	3.90	0.01	34.320	0.000	27.28	87.3	1.115	36.38	0.28	0.00	0.71	
1000	3.35	0.00	34.408	0.001	27.40	76.1	1.280	51.57	0.29	0.00	0.98	
1200	2.93	0.01	34.469	0.004	27.49	68.1	1.426	68.03	0.42	0.01	0.90	
1500	2.44	0.00	34.533	0.000	27.58	59.5	1.620	94.82	0.76	0.00	0.99	

BROWN BEAR CRUISE 318 STATION 103 OBSERVED VALUES
 DATE 18/03/63 HR 16.4 LAT 48-14 N LONG 127-59 W WEA 02 WIND VEL 15 DIR 30
 BAROM 19.3 TEMP DRY 8.0 WET 5.8 RELHU 73 WTRCLR SEA 2 DIR 30 SWELL 1 DIR 30
 CLOUD TYPE 6 AMT 8 VIS 7 WIRE ANGLE(S) 22.10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN
					MGA/L			
2	0	8.63	32.381	25.15	7.23	0.646	-0.071	112
2	5	8.69	32.386	25.14	6.87	0.614	-0.040	107
2	10	8.62	32.386	25.15	9.45	0.844	-0.269	147
2	20	8.64	32.385	25.15	6.74	0.602	-0.028	105
2	30	8.67	32.382	25.14	6.77	0.605	-0.031	105
2	48	8.71	32.394	25.15	7.07	0.631	-0.058	110
2	72	8.67	32.416	25.17	7.20	0.643	-0.069	112
2	97	7.96	33.506	26.13	3.77	0.337	0.242	58
2	121	7.66	33.762	26.37	3.88	0.347	0.236	60
2	144	7.51	33.834	26.45	2.64	0.236	0.348	40
2	168	7.43	33.875	26.49	2.40	0.214	0.370	37
1	190	7.38	33.884	26.51	2.25	0.201	0.384	34
1	285	6.85	33.963	26.64	2.31	0.206	0.386	35
1	478	5.31	34.060	26.92	1.19	0.106	0.509	17
1	717	4.27	34.224	27.16	0.40	0.036	0.595	6
1	959	3.64	34.375	27.35	0.27	0.024	0.616	4
1	1445	2.67	34.508	27.54	0.59	0.053	0.603	8
1	1737	2.24	34.570	27.63	1.11	0.099	0.563	15

BROWN BEAR CRUISE 318 STATION 103 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.41	0.50		32.398
8	0.37	0.96		32.414
22	0.39	0.71		32.379
54	0.42			32.389
100	0.03	0.02		33.457

21.34 28.89 - WATER COLUMN VALUES

MESSENGER TIME 1020 INCOMING SOLAR RADIATION - AM 112 PM 92

DEPTH	BROWN BEAR		CRUISE 318		STATION 103		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0 10 20 30	8.63	0.00	32.381	0.000	25.15	282.5	0.000	0.00	7.23	0.00	0.91 0.85 0.83 0.74	
	8.62	0.00	32.386	0.000	25.15	282.2	0.029	0.02	9.45	0.00		
	8.64	0.00	32.385	0.000	25.15	282.7	0.057	0.06	6.74	0.00		
50 75 100 150	8.67	0.00	32.382	0.000	25.14	283.5	0.086	0.13	6.77	0.00	0.91 0.85 0.83 0.74	
	8.72	0.01	32.377	0.013	25.13	285.0	0.143	0.37	7.15	0.04		
	8.59	0.02	32.540	0.034	25.28	271.4	0.213	0.82	6.79	0.13		
200 250 300 400	7.91	0.00	33.564	0.011	26.18	185.9	0.271	1.32	3.73	0.09	0.89 0.89 0.89 0.76	
	7.49	0.00	33.847	0.000	26.47	159.8	0.358	2.42	2.53	0.03		
	7.34	0.01	33.891	0.001	26.52	155.3	0.437	3.85	2.24	0.02		
500 600 700 800	7.08	0.01	33.931	0.003	26.59	149.6	0.514	5.62	2.24	0.06	1.21 1.21 0.97 0.76	
	6.73	0.01	33.971	0.001	26.67	142.6	0.588	7.70	2.25	0.03		
	5.93	0.05	34.024	0.005	26.81	129.6	0.725	12.60	1.72	0.08		
1000 1200 1500	5.19	0.01	34.074	0.001	26.94	117.8	0.850	18.35	1.09	0.00	0.89 0.67 0.90 0.66	
	4.69	0.02	34.142	0.003	27.05	107.9	0.964	24.77	0.70	0.00		
	4.32	0.01	34.212	0.001	27.15	99.3	1.069	31.75	0.43	0.00		
1000 1200 1500	4.02	0.01	34.280	0.002	27.23	91.7	1.166	39.18	0.31	0.02	0.96 0.89 0.97	
	3.54	0.00	34.391	0.002	27.37	79.5	1.339	55.10	0.27	0.00		
	3.11	0.00	34.457	0.008	27.46	71.1	1.491	72.30	0.34	0.00		
1000 1200 1500	2.58	0.00	34.518	0.002	27.56	62.3	1.694	100.30	0.67	0.00	0.97 0.89 0.97	

BROWN BEAR CRUISE 318 STATION 104 OBSERVED VALUES
 DATE 18/03/63 HR 21-1 LAT 48-29 N LONG 128-00 W SNOG 2487 WEA 02 WIND VEL 13 DIR 27
 BAROM 20.7 TEMP DRY 9.4 WET 7.4 RELHU 76 WTRCLR SEA 2 DIR 27 SWELL 9 DIR
 CLOUD TYPE 7 AMT 7 VIS 6 WIRE ANGLE(S) 11
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L AOU SATN
 1 0 8.61 32.190 25.00 6.78 0.606 -0.030 105
 1 5 8.63 32.182 24.99 6.85 0.612 -0.036 106
 1 10 8.65 32.272 25.06 7.11 0.635 -0.060 110
 1 20 8.75 32.420 25.16 7.09 0.633 -0.060 111
 1 30 8.78 32.402 25.14 6.80 0.607 -0.035 106
 1 49 8.69 32.412 25.16 6.57 0.587 -0.013 102
 1 74 8.64 32.423 25.18 6.69 0.598 -0.023 104
 1 99 8.06 33.076 25.78 5.63 0.503 0.077 87
 1 124 7.86 33.582 26.20 4.05 0.362 0.218 62
 1 148 7.72 33.739 26.35 3.07 0.274 0.307 47
 1 173 7.50 33.818 26.44 3.07 0.274 0.310 47
 1 198 7.28 33.884 26.52 3.11 0.278 0.309 47

BROWN BEAR CRUISE 318 STATION 104 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	LIGHT SAT PROD	IRRAD	SAL	PHOS	NITR	SIL
0	0.67		2.09 1.95 1.19 0.71	100 59 45 22	32.208	0.95	4.8	10
2	0.79	2.09	0.00	5				
11	0.74	2.12			32.179	1.00	4.5	10
38	0.48				32.329	1.00	4.6	10
					32.403	1.03	5.6	11
100	0.02	0.00			33.129	1.73	20.3	24
200	0.03				33.514			

24.79 - WATER COLUMN VALUES

MESSENGER TIME 1235 INCOMING SOLAR RADIATION - AM 112 PM 92

LIGHT SATURATION INCUBATOR ILLUMINATION 16900

DEPTH	BROWN BEAR		CRUISE 318		STATION 104		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	8.61	0.00	32.190	0.000	25.00	296.4	0.000	0.00	6.78	0.00		
10	8.65	0.00	32.272	0.000	25.06	291.1	0.030	0.02	7.11	0.00		
20	8.75	0.00	32.420	0.000	25.16	281.7	0.059	0.06	7.09	0.00		
30	8.78	0.00	32.402	0.000	25.14	283.6	0.087	0.13	6.80	0.00		
50	8.69	0.00	32.406	0.004	25.16	282.4	0.144	0.37	6.58	0.01	0.95	
75	8.62	0.01	32.444	0.005	25.20	278.9	0.215	0.82	6.66	0.00	0.94	
100	8.05	0.00	33.101	0.001	25.80	222.3	0.278	1.38	5.57	0.01	0.94	
150	7.70	0.00	33.747	0.001	26.36	170.3	0.377	2.61	3.05	0.01	0.89	

BROWN BEAR										STATION 105										OBSERVED VALUES									
DATE 18/03/63										CRUISE 318										SEA 1									
BAROM 20.0										LAT 23.6										WIND VEL 8 DIR 27									
CLOUD TYPE 7										HR 23.6										WELL 3 DIR 25									
										WET 6.1										WTRCLR									
										WIRE ANGLE(S) 16.0										SNDG 468									
										SIGMA-T										SECDI									
										SAL										ML/L									
										TEMP										MGA/L									
										OXYGEN										AOU									
										SATN																			
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN																				
2	0	8.43	32.018	24.89	6.87	0.614	-0.035		106																				
2	5	8.48	32.022	24.89	6.91	0.617	-0.039		107																				
2	10	8.43	32.043	24.91	6.79	0.606	-0.028		105																				
2	20	8.54	32.192	25.01	6.85	0.612	-0.035		106																				
2	30	8.57	32.206	25.02	6.76	0.604	-0.028		105																				
2	49	8.61	32.242	25.04	6.65	0.594	-0.018		103																				
2	74	8.61	32.481	25.23	6.22	0.556	0.019		97																				
2	99	8.34	33.064	25.73	4.72	0.422	0.154		73																				
2	124	7.75	33.409	26.08	4.19	0.374	0.208		64																				
2	148	7.31	33.620	26.31	3.97	0.355	0.233		60																				
2	173	7.20	33.855	26.51	3.23	0.288	0.300		49																				
1	194	6.91	33.914	26.60	3.13	0.280	0.312		47																				
1	291	5.96	33.950	26.75	2.33	0.208	0.397		34																				
1	486	4.80	34.100	27.01	0.78	0.070	0.553		11																				
1	731	4.06	34.284	27.23	0.28	0.025	0.608		4																				
1	976	3.46	34.382	27.37	0.28	0.025	0.618		4																				
1	1468	2.49	34.530	27.58	0.74	0.066	0.592		10																				
1	1763	2.12	34.573	27.64	1.15	0.103	0.562		15																				

DEPTH	BROWN BEAR		CRUISE 318		STATION 105		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	8.43	0.00	32.018	0.000	24.89	306.7	0.000	0.00	6.87	0.00	0.95 0.94 0.94 0.89 1.14 1.40 0.98 0.76 0.93 0.68 0.84 0.70 0.97 0.89 0.99	
10	8.43	0.00	32.043	0.000	24.91	305.0	0.031	0.02	6.79	0.00		
20	8.54	0.00	32.192	0.000	25.01	295.6	0.062	0.06	6.85	0.00		
30	8.57	0.00	32.206	0.000	25.02	295.2	0.091	0.14	6.76	0.00		
50	8.61	0.00	32.246	0.001	25.05	293.1	0.151	0.38	6.65	0.00	0.95 0.94 0.94 0.89 1.14 1.40 0.98 0.76 0.93 0.68 0.84 0.70 0.97 0.89 0.99	
75	8.60	0.00	32.503	0.004	25.25	274.3	0.222	0.84	6.16	0.01		
100	8.32	0.00	33.081	0.001	25.74	227.6	0.285	1.40	4.69	0.00		
150	7.30	0.01	33.642	0.002	26.33	172.5	0.386	2.66	3.91	0.01		
200	6.84	0.00	33.921	0.004	26.61	146.3	0.466	4.09	3.09	0.01	1.14 1.40 0.98 0.76 0.93 0.68 0.84 0.70 0.97 0.89 0.99	
250	6.31	0.02	33.957	0.017	26.71	137.5	0.538	5.73	2.70	0.02		
300	5.89	0.00	33.956	0.001	26.76	132.9	0.606	7.66	2.25	0.01		
400	5.22	0.02	34.028	0.004	26.90	120.6	0.734	12.22	1.40	0.04		
500	4.75	0.01	34.112	0.001	27.02	109.8	0.850	17.57	0.72	0.01	0.93 0.68 0.84 0.70 0.97 0.89 0.99	
600	4.40	0.03	34.191	0.003	27.12	100.8	0.957	23.56	0.42	0.05		
700	4.13	0.01	34.263	0.001	27.21	93.3	1.055	30.10	0.28	0.02		
800	3.88	0.00	34.317	0.002	27.28	87.3	1.146	37.13	0.25	0.01		
1000	3.40	0.00	34.391	0.000	27.38	77.9	1.313	52.52	0.29	0.00	0.97 0.89 0.99	
1200	2.97	0.01	34.459	0.001	27.48	69.3	1.462	69.32	0.43	0.01		
1500	2.44	0.00	34.537	0.000	27.59	59.3	1.658	96.28	0.78	0.00		

DATE 19/03/63 HR 07.6 LAT 49-02 N LONG 127-17 W WEA 21 WIND VEL 25 DIR 14
 BAROM 17.3 TEMP DRY 7.3 WET 6.8 RELHU 93 WTRCLR SECDI SNRG 2012 SEA 3 DIR 14 SWELL 1 DIR 24
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 23.22

BROWN BEAR CRUISE 318 STATION 106 OBSERVED VALUES									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	8.40	31.849	24.77	6.93	0.619	-0.039	107	
2	5	8.41	31.845	24.76	6.75	0.603	-0.023	104	
2	9	8.36	31.860	24.78					
2	19	8.35	31.842	24.77	6.77	0.605	-0.024	104	
2	28	8.38	31.860	24.78	6.74	0.602	-0.022	104	
2	44	8.60	32.007	24.86	6.61	0.590	-0.014	102	
2	68	8.09	32.693	25.47	5.90	0.527	0.054	91	
2	90	7.64	33.058	25.82	5.04	0.450	0.135	77	
2	113	7.73	33.619	26.25	3.61	0.322	0.259	55	
2	134	7.38	33.799	26.44	3.36	0.300	0.286	51	
2	159	7.06	33.876	26.55	3.31	0.296	0.294	50	
1	183	6.78	33.915	26.62	2.95	0.263	0.330	44	
1	273	6.01	33.995	26.78	1.86	0.166	0.439	27	
1	458	4.86	34.110	27.01	0.74	0.066	0.555	11	
1	687	4.14	34.265	27.21	0.30	0.027	0.605	4	
1	917	3.56	34.382	27.36	0.30	0.027	0.614	4	
1	1382	2.67	34.515	27.55	0.65	0.058	0.597	9	
1	1660	2.26	34.568	27.63	1.06	0.095	0.568	14	

BIOLOGICAL DATA

STATION 106

CRUISE 318

BROWN BEAR

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.69			31.830
2	0.75			31.825
11	0.82	0.99		31.832
38	0.51	0.78		31.877
100	0.03	0.00		33.055

26.46 - WATER COLUMN VALUES

MESSENGER TIME 0033

DEPTH	BROWN BEAR		CRUISE 318		STATION 106		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	8.40	0.00	31.849	0.000	24.77	318.8	0.000	0.00	6.93	0.00	1.07 0.85 0.92			
10	8.35	0.00	31.859	0.002	24.78	317.6	0.033	0.02	6.72	0.03				
20	8.35	0.00	31.842	0.000	24.77	319.0	0.065	0.07	6.77	0.00				
30	8.41	0.01	31.868	0.002	24.78	318.1	0.097	0.15	6.73	0.00				
50	8.52	0.03	32.166	0.027	25.00	297.7	0.159	0.40	6.47	0.01	0.81			
75	7.92	0.02	32.814	0.015	25.59	241.5	0.227	0.83	5.66	0.01	0.67			
100	7.67	0.04	33.314	0.023	26.02	201.3	0.282	1.32	4.38	0.07	0.66			
150	7.17	0.00	33.859	0.004	26.52	154.6	0.372	2.44	3.33	0.02	0.69			
200	6.61	0.01	33.935	0.002	26.65	142.4	0.447	3.78	2.71	0.00	1.23			
250	6.18	0.01	33.980	0.003	26.75	134.1	0.517	5.39	2.10	0.00	0.93			
300	5.81	0.00	34.014	0.002	26.82	127.6	0.583	7.25	1.63	0.02	0.94			
400	5.16	0.00	34.077	0.003	26.95	116.2	0.706	11.64	0.97	0.03	0.75			
500	4.69	0.02	34.139	0.001	27.05	107.1	0.818	16.83	0.60	0.02	0.81			
600	4.36	0.02	34.208	0.002	27.14	99.1	0.922	22.70	0.38	0.02	0.68			
700	4.10	0.00	34.273	0.000	27.22	92.3	1.019	29.15	0.29	0.00	0.93			
800	3.84	0.00	34.327	0.000	27.29	86.1	1.109	36.09	0.27	0.01	0.60			
1000	3.38	0.00	34.413	0.002	27.40	76.0	1.273	51.18	0.33	0.00	0.93			
1200	2.98	0.00	34.474	0.003	27.49	68.3	1.420	67.66	0.46	0.00	0.88			
1500	2.49	0.00	34.538	0.001	27.58	59.7	1.614	94.54	0.81	0.00	0.83			

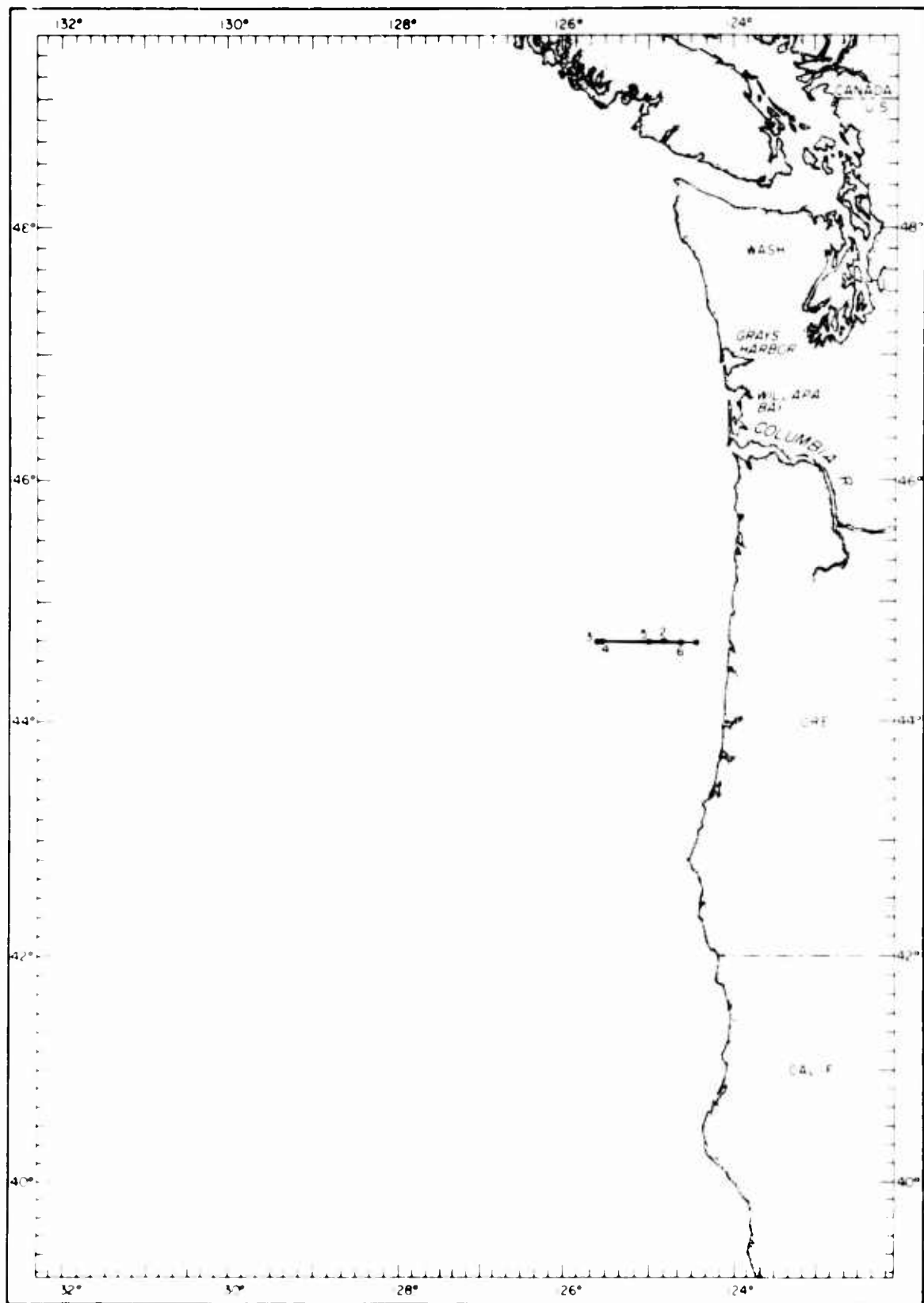


Fig 3 Station locations Aconda Cruise 6301-E, 24-25 January 1963

AC CRUISE 631 STATION E01 BIOLOGICAL DATA

DATE 24/01/63 LAT 44-38 N LONG 124-25 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	PROD	LIGHT SAT FILT	SAL	PHOS	NITR	SIL
0	3.61	27.52		16.48 13.42 9.70 8.03	100 78 56 32	31.268	0.79	2.9	11
4	3.57	14.84		2.86 0.45	11 4				
12	1.20	0.88				31.291 32.256	0.72 0.93	2.9 5.9	11 12
24	0.55	0.78				32.452	1.03	4.8	8
	43.95	160.76	-	WATER COLUMN VALUES					

MESSENGER TIME 1125 INCOMING SOLAR RADIATION - AM 47 PM 42

LIGHT SATURATION INCUBATOR ILLUMINATION 27000
 THE NOTATION AC 631-E01 MEANS R/V ACONA CRUISE 6301-E, STATION 1.

AC CRUISE 631 STATION E02 BIOLOGICAL DATA

DATE 24/01/63 LAT 44-39 N LONG 124-47 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL
0	0.63			0.88	100	32.546
6	0.93			0.79	78	32.446
				0.78	56	
				0.75	32	
20	0.86			0.37	11	32.441
41	0.99			0.08	4	32.445

36.57 - WATER COLUMN VALUES

MESSENGER TIME 1640 INCOMING SOLAR RADIATION - AM 47 PM 42
 LIGHT SATURATION INCUBATOR ILLUMINATION 27000

AC CRUISE 631 STATION E03 BIOLOGICAL DATA

DATE 25/01/63 LAT 44-39 N LONG 125-33 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	PROD	LIGHT SAT FILT	SAL
0	0.41					32.646
6	0.42					32.652
20						32.649
41	0.43			0.92	100	32.659
				0.90	78	
				0.82	56	
				0.75	32	
				0.42	11	
				0.05	4	

17.47 - WATER COLUMN VALUES

MESSENGER TIME 0720 INCOMING SOLAR RADIATION - AM 87 PM 36
 LIGHT SATURATION INCUBATOR ILLUMINATION 27000

AC CRUISE 631 STATION E04 BIOLOGICAL DATA

DATE 25/01/63 LAT 44-39 N LONG 125-31 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	0.42		3.80			32.619	0.91	3.9	10
8	0.42		2.44			32.617	0.90	3.9	11
26	0.47		0.38	0.67	100	32.636	0.92	5.9	10
				0.54	78				
52	0.34		0.02	0.57	32				
				0.37	11				
				0.07	4				
						32.653	0.88	6.0	10

21.96 75.54 - WATER COLUMN VALUES

MESSANGER TIME 1115 INCOMING SOLAR RADIATION - AM 87 PM 36
LIGHT SATURATION INCUBATOR ILLUMINATION 27000

AC CRUISE 631 STATION E05 BIOLOGICAL DATA

DATE 25/01/63 LAT 44-39 N LONG 124-57 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL
0	1.25			2.42	100	32.384
				2.67	78	
				1.72	56	
				2.12	32	
6	1.07			0.85	11	32.382
22	1.13			0.13	4	32.380
43	0.46					32.493

41.34 - WATER COLUMN VALUES

MESSENGER TIME 1345 INCOMING SOLAR RADIATION - AM 87 PM 36

LIGHT SATURATION INCUBATOR ILLUMINATION 27000

AC CRUISE 631 STATION E06 BIOLOGICAL DATA

DATE 25/01/63 LAT 44-39 N LONG 124-35 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL
0	0.64					32.279
4	0.60			1.09	100	32.383
12	0.77			1.00	78	32.321
				0.77	56	
				0.94	32	
				0.55	11	
				0.06	4	
24	0.73					32.449

MESSENGER TIME 1920 INCOMING SOLAR RADIATION - AM 87 PM 36
 LIGHT SATURATION INCUBATOR ILLUMINATION 27000

Unclassified

Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

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		2b. GROUP	
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13. ABSTRACT This report contains tabulated physical, chemical, and biological data collected during Cruise 318 of the Research Vessel <u>Brown Bear</u> and biological data collected during Cruise 6301-E of the Research Vessel <u>Acona</u> during the months of January - March 1963 in an area within 250 miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific.			

Unclassified

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Oceanographic data Physical oceanographic data Chemical oceanographic data Biological oceanographic data Oceanographic cruises Research Vessel <u>Brown Bear</u> Research Vessel <u>Acona</u> Northeast Pacific Ocean Washington - Oregon coast Columbia River Effluent water						

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